













*Colors—What They Can Do for You*







# Colors

WHAT THEY CAN DO  
FOR YOU

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**I dedicate this book  
to MARY CHESKIN,  
my mother.**





*I want to acknowledge my indebtedness to George D. Gaw for his advice and assistance in preparing the material for this book.*

*Louis Cheskin*



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**I*****The Cost of Color Ignorance***



## ***The Cost of Color Ignorance***

Prehistoric man used color as a medium of emotional and communicative expression. In ancient times, color played a vital part in religion. Because color was elevated to the realm of the divine, it needed no explanation.

Since Newton's discovery of the nature of color nearly three hundred years ago, many books have been written on the physical aspects of color, and there have been some mystical writings on the subject plus some in connection with art. The psychological aspect of color has generally been neglected; yet it is the psychological factor that is most important in our daily lives.

If the purely physical aspects of life were sufficient, human beings would be satisfied with caves or barracks for shelter and with animal skins or sackcloth for clothing. We would not want design in architecture and apparel, or expression in the arts.

Because of ignorance of the nature of color, we have much avoidable discomfort in the home, unnecessary irritability, emotional instability, considerable loss in industrial production, inefficiency in offices, and large financial losses in merchandising.

In recent years, much attention has been given to the matter of efficiency in industry. Time and mo-

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tion studies have been made, safety gadgets have been installed, but some of the simplest and least costly factors are still neglected by most manufacturers.

The following conditions are common in industrial plants: white walls, brilliantly colored walls, near-black walls, dark painted ceilings, dirty, unpainted ceilings, near-black floors, black or dark gray machines, black inspection tables, near-white inspection tables, bright red machine tools. Each of these conditions contributes to inefficiency and slows down production.

The plant needs repainting. "Have the walls calcimined," says the superintendent, unaware that white, with its strong light-reflecting power, will blind the workers at the machines and bring about inefficiency, loss of production, and accidents.

A business executive finds that the walls in his office need cleaning. He calls in a contractor, leaving the color choice to him or to the painter or the paint distributor. He does not realize that the color choice can have either good or bad effects on the employees.

A product is not selling well. The manufacturer suspects that the package is unattractive, and he decides to change it in order to increase sales. In choosing a new package design, he often disregards the fact that his taste is not that of the buying public. Many advertisers choose colors and designs they like. They, of course, believe that they are selecting the color and design the public likes.

## THE COST OF COLOR IGNORANCE

A restaurant operator has to repaint his establishment. He tells the contractor to do an attractive job. Someone decides on the color scheme, but the psychological power of color is not considered objectively at all.

A woman buys a yellow dress, not because it enhances her complexion or fits her character or personality, but because she believes it to be fashionable.

A man buys a drab suit because he is fearful of showing an emotional reaction to color.

Numerous works of art are hung on walls in the home, not because the forms and colors in the pictures are stimulating or soothing, but because the artist is in fashion.

A housewife wants her apartment redecorated. She calls in an interior decorator who tells her (because he likes blue or happens to have too many cans of blue paint on hand) that blue is very pretty and very popular this year. The people who live in the house think it makes little difference what color is chosen because they are unaware of the powers different colors have over them. They do not realize that blue may result in an environment that is unpleasant for them, although it might be excellent for others.

White walls are psychological irritants; yet numerous hospitals have white or near-white walls that aggravate the patient's condition and retard the process of getting well.

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White-walled schoolrooms have caused many a boy and girl to stay away from school, but the truancy has been attributed to something else.

These are only a few examples of the nihilistic use of color. Color misuse is prevalent in every phase of life—in the home, in the office, in the plant and in our wardrobes.

In our daily lives we find that color is a factor in space and in form, in patterns and in three-dimensional objects. Color, art and design are interdependent. In discussing color, therefore, art and design and the nature of space and of form must be considered.

There is no such thing as absence of color. Color is always present—good color or bad color, but color nonetheless.

## II

### *What Is Color?*





## ***Color Is Light***

Color is light. Where there is no light, there can be no color. Not only do we not see color in a dark room, but the color really is not there. White light is a mixture of colors.

Colors are wave lengths of light. At one end of the spectrum of radiant energy are radio waves and infrared waves of heat that are very long and invisible. At the opposite end of the spectrum of radiant energy are the invisible, very short ultraviolet waves, followed by the even shorter cosmic ray waves. Between the very long and invisible sound waves and infrared waves at one end of the spectrum and the very short and invisible ultraviolet waves and cosmic waves at the other end are the waves of radiant energy that are visible. These waves are the components of visible light, which we call color.

The colors are seen when a ray of white light is broken up into its component parts by a prism. An ordinary drinking glass with a prismatic design will often break up a ray of light into bands of color that can be seen in all their purity.

The ribbon of hues in a broken ray of light, known as the visible solar spectrum, consists of three basic or primary hues which cannot be broken down into component colors. These overlap and mix into

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more than a hundred hues which can be detected only with precision instruments.

With the naked eye we can see in the spectrum, in addition to the three primaries, three secondary hues.

Specific colors correspond to definite wave lengths of light. Mixtures of colors are mixtures of wave lengths. Violet is at the shortest wave end of the visible spectrum. Magenta red is at the longest. Beyond violet the spectrum goes into the very short invisible ultraviolet waves and beyond deep red are the much longer invisible infrared waves of heat.

White light basically consists of violet-blue, green and orange-red. These are the primary colors of light which the physicist calls merely blue, green and red. The other colors we see in the spectrum (broken-up beam of light) are mixtures of primaries.

The color of an object is the reflected part of the light. For example, when an object is red it means that the surface of that object has absorbed the blue and green from the light. In other words, red is white light without green and blue.

When a surface reflects all colors equally we see white. When a surface absorbs all colors equally we see black. Most things in nature are neither pure black nor pure white because they partly reflect and partly absorb color.

## WHAT IS COLOR?

### *Color Is in the Earth*

The brief analysis of color from the physicist's point of view explains what color is. However, the physicist cannot tell us how to make pigments. The making of paint is left to the chemist. To him there is no such thing as a red or a green or a blue because he develops all sorts of reds, greens and blues from a variety of ingredients and chemical compounds.

Indigo is obtained from an Asiatic plant, alizarin from the madder plant, carmine from an insect found in Mexico. Numerous colors are made from minerals and earths.

Most colors are now made synthetically from colorless elements. Chemists are producing, from coal tar and carbon, innumerable colors that cannot be seen in the spectrum.

Chrome yellow, cadmium yellow and yellow ochre have distinct characteristics because each is of a different chemical composition.

While the physicist deals with colors that come from the sun, the chemist gets his colors from the earth. He makes numerous combinations and arrangements of atoms and produces compounds that reflect and absorb light in various wave lengths that determine specific colors, many of which cannot be seen in the broken-up beam of white light.

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### *Color Is Paint and Ink*

In painting and printing, the color principles of the physicist are useless. The person who paints or prints in color knows that the three primary colors are yellow, magenta red and green-blue, not green, orange-red and violet-blue, as with light.

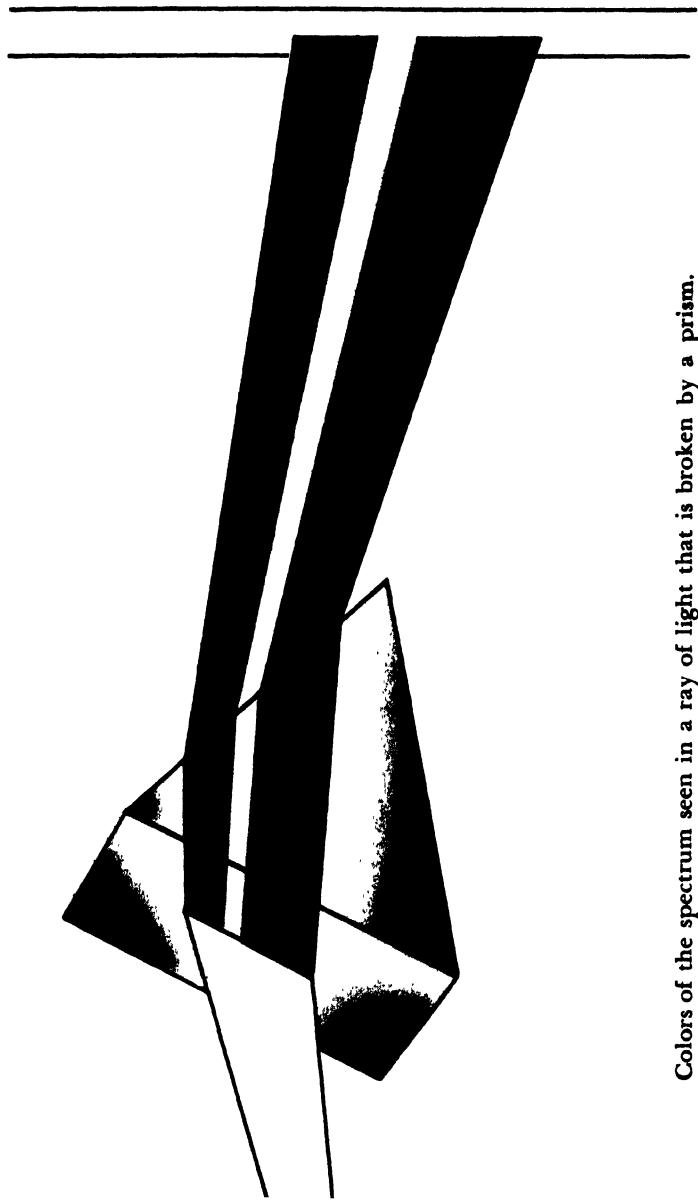
The painter or printer calls his primary colors yellow, red and blue, which he knows he cannot make from other colors. But he can produce green by mixing blue and yellow, orange by mixing red and yellow, violet by mixing red and blue. And these are not the same kind of red and blue the lighting engineer calls red and blue.

Numerous tints can be made by mixing white with the color pigment, and many shades can be made by mixing various amounts of black with the hue. A tone is produced by adding black and white (gray) to the hue.

Since pure pigments are for most purposes too strong to be applied directly, a quantity of white is generally mixed with each hue in order to cut down the strength of the color.

To make his printed matter legible, the printer in color uses black to deepen the hue. The artist rarely uses black pigment because he can produce it by mixing the three primaries.

The trained artist or designer can mix a multitude of shades, tints and tones by using yellow,



Colors of the spectrum seen in a ray of light that is broken by a prism.



## WHAT IS COLOR?

magenta red, green-blue and white in various proportions.

### *Color Is in the Eyes*

Physiologists have found that there are not three but four primary colors. These—red, green, blue and yellow—are known as the physiological primaries. The eye is sensitive to these four colors in pairs. Red and green are seen in their true hue in one part of the eye by one organ, while blue and yellow are seen in another part of the eye by another organ. These organs of vision, the rods and cones of the retina, co-ordinate in seeing color mixtures. A third organ controls the sight of black and white. )

Afterimages demonstrate that the pairs of colors (red and green, and blue and yellow) are inseparable twins of the eye. If you look at red for about thirty seconds or more, then turn to a white or light neutral surface, you will see green. If you look at yellow and turn to a white or light neutral surface, you will see blue. And vice versa.

Other evidence that colors are seen in pairs by two nerves is that color blindness is not in one primary color nor in three colors, but in two or in all four colors. People are color blind to red and green, or to blue and yellow, or to all four, but they are not blind to one color alone.) Color blindness to the four primaries means inability to see any hue.

It is evident that the pairs of colors—red and





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green, blue and yellow—are physiologically related and are complementary to each other. Thus the effect of harmony that we get from seeing red and green together is actually physiological in nature. The same is true of blue and yellow.

Since we are in contact with more than one color at one time, color harmony is an important factor in our sensations. Just as in sound there is harmony or discord (noise), so in color there is harmony or discord (gaudiness). Colors that may be pleasing separately can be discordant when placed side by side.

The colors we see consist of wave lengths to which the human eye is sensitive. Insects and many other creatures respond to other wave lengths and see other colors. Whereas the range of wave lengths as used by radio broadcasting stations is from 200 to 600 meters, light wave lengths are very short, ranging from 400-billionths to over 700-billionths of a meter.

The difference between wave lengths of sound and those of color is so great that there is hardly a basis for comparison. Comparing a sound with a specific color is, therefore, purely subjective, even though the word "harmony" is used to describe related colors as well as related sounds.

## WHAT IS COLOR?

### *Color Is Psychological*

The physicist studies colors in light. The chemist produces pigments. The artist mixes colors to produce beautiful designs and pictorial compositions. The physiologist or medical doctor studies the relationship of color to the eyes and to other parts of the human body. The psychologist, finally, studies color as it affects man's emotional life.

We all experience color sensations. Many people, however, completely lack color perception—that is, they are not aware of their color environment and have no conscious reactions to specific colors. Only occasionally do we hear an expression like “I hate this color” or “I love that color.”

But color sensation affects people who are completely unaware of the presence of color. Often the visual sensation produces a physical reaction. People will feel cold in a blue room and hot in a red room, yet not realize that the color produces the sensation.

Colors are divided into two distinct groups, cool and warm colors. The cool colors are blue and colors predominantly blue. The warm colors are red and colors predominantly red and yellow.

The cool colors have a sedative effect, and being in an environment of cool colors has proved to be very calming to highly nervous people who feel extremely uncomfortable in an environment with an abundance of certain types of red. Some persons be-

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come depressed when surrounded by strong blue. Still others react negatively to yellow.

Generally, people surround themselves with diluted colors (tints or tones) of both cool and warm hues, unconsciously seeking a balanced diet of calming and stimulating colors.

We should always differentiate between our sensations of colors and our knowledge of them. Our sensations come through the senses; our knowledge comes through the intellect.

(Sensations plus associations result in perceptions. Knowledge comes only after the perceptions have been analyzed and formed into distinct conceptions.

Most experience with color is only on the level of sensation; most people are not conscious of color effect and have no awareness of its influence. However, although color sensation does not always reach the conscious mind, it nevertheless creates an emotional response) which is best illustrated by the fact that people feel cold in a blue room and warm in a room with much red.

### *Color Is Beauty*

Color is an important psychological factor in our daily lives and is universally associated with beauty. A beautiful form is made up of varied parts, all complementing one another. Beautiful colors, like beautiful forms, possess elements of variety.

## WHAT IS COLOR?

The complementary relationship of varied structural parts is known as proportion, while the complementary relationship of colors is commonly known as harmony, as is the complementary or proportional arrangement of sounds. Pleasing arrangements are generally described as aesthetic.

Normally, people are pleasantly affected by proportional arrangements of sounds, forms or colors. But we should realize that although aesthetic appreciation is basically instinctive, it becomes enhanced or modified with the accumulation of aesthetic experiences.

When the aesthetic sensations are converted into mental images, they become perceptions which often develop into intellectual conceptions. Those who discuss music or art have definite conceptions on the subject.

Primitive peoples produce art and decoration with pure, bright colors, while most civilized peoples prefer to decorate their homes mainly with subtle tints or tones, using pure colors only as accents.

In music also, musically untutored individuals are deeply moved by loud, sharply rhythmic syncopation, while those with developed musical sensibilities prefer to hear the subtle nuances of a symphony with only accents of powerful sounds.

Environment undoubtedly influences color preference. Persons of European peasant origin, particularly those from Eastern countries, show a preference for pure, bright colors, while their city-bred children

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generally prefer more neutral and delicate colors. Latin peoples—Italian, French, Spanish—usually prefer the warm colors of the red-yellow families, whereas Nordics—Swedish, Norwegian, Danish—generally like the cool colors of the blue family. Persons who have lived in the Orient often develop a taste for Oriental art and color.

Although a color has inherent character, it is at the same time endowed with social symbolism and with considerable subjectivity. Colors have entirely different symbolic meanings for Eastern peoples than they have for Westerners, and, also, in the same family there may be great difference in color preference.

In other words, concepts of beauty are threefold: universal, social and individual. Proportion and harmony are universally recognized as the basic essentials of beauty. In other respects, ideas of beauty differ in various countries in accordance with the type of civilization or culture. And within the social concept of beauty, there is still the element of personal taste.

Specific colors inherently produce sensations of warmth or coolness, stimulation or relaxation, cheer or gloom, pleasantness or unpleasantness. Blue is a cold color to a Frenchman, a Swede, or a Russian, and red is warm to all of them.

We should realize that color symbolism is not the same in all parts of the world. Color symbolism in Western civilization is best exemplified by such prac-

## WHAT IS COLOR?

tices as using brilliant red as a fire signal, green as representing nature, pink as a sign of health. These objective color symbols are generally recognized in our society.

However, color sensations are often purely subjective. A color that produces a pleasant sensation for most people—magenta red, for example—may for some individuals have a very unpleasant effect because of an early traumatic experience associated with the color.

A typical example of subjective color reaction due to an early traumatic experience is that of the girl who has a strong dislike for light blue because an aunt who was very cruel to her frequently wore a light blue dress.

Color preference tests have demonstrated that reds, violets and blues (half of the color circle) are liked much more than oranges, yellows and greens. Among men blue is the first choice, and red is the favorite of women.

However, difference in preference between two values of the same hue is often greater than between two different hues. For example, of the pure hues, green-blue has a preference rating of nearly 80 and yellow has a preference rating of about 60. In other words, there is a difference of about 20 points between the preference ratings for pure green-blue and pure yellow. When green-blue is deepened with black and converted into a shade, its rating drops 10 to 15 points. When the yellow is deepened with



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black, on the other hand, its rating drops more than 40 points.

Transforming hues into tints may either raise or lower their preference ratings. For example, pure magenta red has a very high preference rating. When the magenta red is mixed with white and reduced to pink, however, it becomes cold and ceases to be a popular color. Orange-red has a very low preference rating in an undiluted state. It is liked by few people because it is much too vibrating and sharp. However, when orange-red is diluted with a quantity of white and converted into a peach, it receives one of the highest preference ratings. Most tints of peach are very popular with both women and men.

In addition to the specific value of the hue, color preference is conditioned by the area the color occupies, by the presence of other colors, and by the object with which the color is associated (in the room or in the mind).

Pure colors are generally preferred only in small areas. A certain red may be acceptable and even pleasing next to a neutral background, but it may give the effect of being much too vibrant when placed next to green, its complementary. A color may be liked when associated with the wall of the room, but disliked as a color for a garment.

In color preference rarity is also a factor that should be given consideration. Red, violet and blue are sometimes preferred because they are rare colors in nature, in addition to being inherently more

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pleasing psychologically than the other colors. Red, violet and blue flowers are few in comparison with green grass and leaves. Rich blue skies and violet and red sunsets are seen only occasionally.

Elements associated with rarity are surprise and newness. Surprise is emotionally stimulating and newness is intriguing. We should remember, however, that complete newness and shocking surprise may be negative in effect.

We are generally pleased by something new about the old. The new aspect is stimulating, and the old gives us the feeling of familiarity and thus creates a sense of security.

Because some colors are seen only occasionally, they possess the elements of newness and surprise as well as familiarity. But common colors, like common foods, are monotonous. They become tiresome, and we therefore set out to look for new stimulants.

### *Light and Pigment Are Related*

The colors we see when a ray of light is passed through a prism are generally called violet, blue, green, yellow, orange and red. These bands of color correspond to specific wave lengths.

Each kind of light source has a different percentage of spectral color distribution.

A ray of general daylight shows very little violet. The other colors are present in about equal pro-

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portion, though there is just a little less red than any of the other colors, and just a little more blue than any of the other hues. The time of day is a factor in how the colors are proportioned.

A ray of direct sunlight has very little violet, a little less blue than general daylight, much less blue than north light, less green, just a little more yellow, and much more orange and red than north light.

North light has more violet than general daylight, much more blue, a little more green, less yellow, much less orange and still less red.

A daylight fluorescent tube has the spectral colors in about the same proportion as natural daylight.

An incandescent electric bulb or a white fluorescent tube has a maximum of red, only a little less orange, still less yellow, very little green, a mere touch of blue and hardly any violet. This type of light is commonly known as yellow or warm light.

The distribution of spectral colors shows why some light is cold and some warm. It shows that light containing a maximum of red, orange and yellow (more red than yellow) is warm. Light containing a maximum of violet, blue and green (least of green) is cold.

It is worth noting that the hues that make white light cool are the hues that are classified as cold or cool colors in pigments. The hues that cause white light to be warm are the hues that are classified as warm colors in pigments. Here we see a direct relationship of light to surface colors.

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Of course, the terms cold and warm as used in relation to light and to pigments do not refer to sensations of temperature. The coldness and the warmth are visual sensations.

The color of an object depends on two factors: its pigmentation and the light in which the object is seen. Cold light makes an object cooler looking no matter what its actual color is, and warm light makes it appear warmer. Thus the type of lighting has a great effect on all surface colors.

How much light and surface color act upon each other is demonstrated by the fact that when a green light is directed on a red object the surface of the object will appear black because all of the light is absorbed.

Colors are mixed subtractively and additively. Mixing primary color pigments is a subtractive procedure. The three primaries for subtractive mixture are green-blue, magenta red and yellow. Mixing primary color lights is an additive process. The three primaries for additive mixture are orange-red, green and violet-blue.

In addition to actual mixing of color pigments, glazing one color paint over another, laying one color filter over another and printing one color ink over another are all subtractive processes, because adding a color means subtracting a portion or all of the light.

The subtractive procedure with pigment prima-

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ries is used in half-tone color printing, but the solid colors seen by the eye result from the additive mixture of the color dots of the screen. In other words, the eye cannot see the tiny individual dots but mixes into a single color the color lights which the dots reflect. Painting as practiced by the Impressionists, by putting small strokes or spots of color next to one another, is also an additive process of mixing color.

In pigments, where we use the subtractive procedure, green-blue and yellow make green, magenta red and yellow make orange-red, green-blue and magenta red make violet-blue. When all three primary colors of pigment are combined, black is the result.

In light, where we use the additive procedure, violet-blue and green produce green-blue, orange-red and violet-blue produce magenta red, orange-red and green produce yellow. When all three primary colors of light are combined, white light is the result.

The primaries for subtractive mixture (pigment) are the exact complements to the primaries for additive mixture (light).

Complementary colors that are mixed subtractively (pigment) make black. Thus magenta red and green make black. Orange-red and green-blue make black. Yellow and violet-blue make black.

Complementary colors that are mixed additively (light) result in white. Thus magenta red and green make white light. Orange-red and green-blue make

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white light. Yellow and violet-blue make white light.

Note that mixing two complementaries (additively or subtractively) is exactly the same as mixing the three primary colors, because one of the complementaries is a secondary color, a mixture of two primaries. In pigment, for example, mixing magenta red, a primary, and green is the same as mixing magenta red with green-blue and yellow, because green consists of green-blue and yellow. In light, the green is the primary and the magenta red consists of orange-red and violet-blue.

Light and pigment affect each other. Surface colors modify light by absorbing and reflecting parts of it. And light modifies a surface color by causing it to appear lighter or darker, warmer or cooler. The basic relationship between light and matter becomes evident when we realize that the primary colors of light are complementary to the primary colors of pigment.

### *Are Black and White Colors?*

We should remember that to the physicist, black and white are not colors. To him, white light consists of all colors, whereas black is the absence of color. A white surface reflects all colors. Black, on the other hand, absorbs most of the light, which means most of the colors.

Psychologically, however, black and white are

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colors because they produce sensations, and they have symbolic meanings as well as definite effects on visibility.

Black and white give tonality to hues, and we see the three dimensions of an object in gradations of light and dark. In pigments, white and black are not only entities in themselves but have a strong effect on other colors in two ways, by mixture and by juxtaposition.

When mixed, black converts a vibrant red into a deep brown; white converts a vibrant red into a soft peach or pink. When a hue is thus transformed, its entire character is changed.

By juxtaposition, black makes adjacent colors look richer, and white reflects light into adjacent colors.

It is evident that black and white not only have psychological effect in themselves but are factors in the character of other colors.

### ***How Many Colors Are There?***

When Newton broke up a beam of light with a prism and saw the colors of light for the first time under controlled conditions, he named the colors violet, indigo, blue, green, yellow, orange and red.

His identifying the colors as seven in number has caused great confusion among students of this subject. Romanticists have associated the seven spectrum colors named by Newton with the seven notes

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of the musical scale and have attempted to relate color harmony to musical harmony.

We know now that there are three primary colors in light—orange-red, green and violet-blue—and that the other hues in the visible spectrum are mixtures of the primary colors. And from practical experience in using pigments, we know that the colors that are secondary in light are the primaries in pigment.

With the pigment primaries—green-blue, yellow and magenta red—we can create a limitless number of color values. We produce a shade by adding black to the hue. We make a tint by adding a great quantity of white to the hue. We create a tone—that is, we gray the hue or change its chroma—by adding both black and white to the hue. And we create new hues by mixing primary hues with each other.

Artists and designers neutralize colors by mixing complementaries—magenta red and green, violet-blue and yellow, green-blue and orange-red, etc.—just as they mix the complementaries to produce black, but in different proportions.

Although complementary colors intensify each other when placed together, they subtract from each other's strength when mixed. A bit of red will cut down the brilliance of green. A bit of green will cut down the purity of red. And the same is true with violet and yellow.

Hundreds of color pigments are manufactured and thousands of colors can be obtained by mixing



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hues with each other and by mixing them with white or with black, and with white and black (gray).

### ***Color Is Illumination***

Hues, shades, tones and tints all reflect some of the light that strikes them. Of the pure hues, yellow reflects about 15 per cent of the light and blue about 5 per cent. Shades reflect from 3 to about 8 per cent, tones reflect from 20 to 40 per cent, and tints reflect from 60 to 80 per cent of the light striking them.

The darker the color, the more light it absorbs; the lighter the color, the more light it reflects. Therefore, the color value that the surfaces have is an important factor in all interiors where illumination is a problem.

Furniture, as well as walls, ceiling and floor, is a factor in lighting.

Where proper lighting cannot be obtained by providing an additional light source, more illumination can be created by making the surfaces of the interior lighter in color.

In the case of a ceiling that is not within the line of vision, white should be used because it will reflect 10 to 15 per cent more light than a tint.

However, if needed lighting can be provided by merely adding natural or artificial illumination, the reflection factor of the color should be disregarded,



**Combining primary colors of pigment by subtraction.**

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and only the psychological aspect should be given consideration.

### *Color Is Temperature*

Since color and heat are both caused by sunlight, the relationship of color to temperature is evident. Because white reflects light it also reflects heat. Black absorbs light and therefore absorbs heat.

When Piccard went up into the stratosphere in a black gondola, the temperature outside the gondola registered 75 degrees below zero, but the temperature inside the gondola was 100 degrees above. On his second trip he used a white gondola, and when he reached the stratosphere the temperature inside the gondola was below the freezing point.

After that, gondolas used for ascending into the stratosphere were half black and half white. When Fordney and Settle went up in a black-and-white gondola, they were quite comfortable. The black half of the gondola absorbed a sufficient amount of heat from the rays of the sun.

Members of a polar expedition kept their drinking water from freezing by painting the bags black. During the day these bags absorbed sufficient heat from the sun to raise the temperature of the water to 60 degrees Fahrenheit when the outside air was 20 below zero.

Half of each side of a cottage in the mountains

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was painted white and the other half black. The white parts gathered a thick coat of ice while the black remained clear for some time.

Black horses have been found to be affected by heat more than horses of any other color. The white charger suffers from heat least of all.

Black absorbs the sun's rays whereas white reflects most of them. Black clothes therefore are best for winter. White clothes are most comfortable in summer when we desire to throw off the heat from our bodies.

White has always been noted as a cool color, black as warm. That is why white apparel is worn in tropical climates and dark clothes are worn in arctic regions.

The proximity of a color to white or to black determines how much heat is reflected. The nearer the color is to black, the more heat it absorbs. The nearer the color is to white, the more heat it reflects.

Delicate colors do not absorb enough heat to matter. The way to enjoy color and still have maximum comfort in summer is to wear clothes of pastel colors.

The most outstanding and horrible examples of how colors absorb and reflect heat were reported from Hiroshima after the atomic bomb struck. Those who wore clothes with patterns had the designs burnt into their flesh. The deep colors caused very deep burns; the lighter tones caused only surface burns. Where the delicately tinted parts of the design covered the body, there were no burns. It is

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worth knowing that even the terrific heat from an atomic explosion can be repelled by a white or near-white garment.

Absorption and reflection of heat by color is an important factor in heating interiors.

A black radiator will get much hotter than a white one, but the heat it transmits into the room is considerably less. Metallic aluminum or gold paint transmits heat much better than black, but not nearly as well as white. A white radiator of five sections radiates as much heat as a radiator of six sections with metallic paint. In order to get both maximum radiation and the psychological benefits of color, a delicate tint should be applied to the surface of radiators.

### *Color Is a Preservative*

The ancients attributed universal power to the sun. Although they had no scientific methods for measuring its contribution, they were sure the sun controlled life and therefore were sun worshipers.

Sunlight is necessary to life and growth, but it also destroys life. It promotes the growth of plant and animal; it also parches crops and causes sunstroke and sunburn. Because colors are components of sunlight, they have the characteristics of sunlight to give life and to destroy it.

It is known that ultraviolet rays are essential to

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life, but they destroy vitamins in food, fade pigments and tan the skin. However, science has found that brown-colored glass will eliminate ultraviolet rays. Infrared rays also damage food. These are kept out with green. For a number of years brown and green containers have been used to protect medicines, and now they are used for preserving foods from harmful rays.

We have learned to control the properties of light to a large degree. We know that ultraviolet rays are beneficial to growth; so we have developed colorless materials that admit such rays where and when we need them. Where these rays destroy health-giving properties, we keep them out with colors.

### *Color Is Biological*

Many species of animals are by nature endowed with camouflage as a means of defense. For example, the walking-stick insect has the shape and color of the twigs of trees, and butterflies look like flowers. Harmless snakes often resemble poisonous species. The frog is green because it lives in water, and the brown of the toad resembles its environment. The polar bear's color blends with the white snow. The tiger's stripes resemble the jungle foliage, and the zebra's stripes are excellent camouflage in the tall grass.

Some of the animals change color with change of environment. Rabbits and foxes change their fur

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with the change in season. The chameleon can change its color instantaneously. Some species of lobsters and crabs match their color to the surface on which they happen to be, and many types of fish change color to meet changing conditions.

In prehistoric times, when man still lived in caves, he learned to use protective coloration on his hunting expeditions. African tribesmen put on war paint to make themselves look more fierce than they really are.

Among civilized nations, camouflage plays an important role in warfare. Modern man has made camouflage a science. Complicated structures and patterns have been devised for hiding military installations, vehicles and troops and for creating the appearance of military activity where it is nonexistent.

The olive drab uniform of the American army is effective camouflage for military operations with large groups of men when the opposing force is at a distance. For closer combat involving small groups of men in the jungle, blotches of yellow and green are painted on the uniform. Tanks are painted olive drab for summer warfare and white for winter warfare. Color is as important a factor in modern warfare as it is to the savage, beast and insect.

Quadrupeds have only black and white vision; they do not see colors. Neither the toreador's bull nor the horse nor the dog nor the cat sees any color,



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but many insects, fishes and birds and all human beings who are not color blind see color.

Experiments with colored papers have shown that butterflies are attracted by green in the egg-laying period and by various flower colors when they are looking for food. However, insects do not see the same colors that humans do.

Birds use color as a medium for sex attraction. Also worthy of note is the fact that in the bird family it is the male that wears the beautifully colored feathers with which he attracts, mystifies, dazzles and conquers.

### *They Worshiped Color*

The ancients worshiped the sun and associated colors with light. They attributed mystic powers to colors. They symbolized life and goodness with bright colors, death and evil with black.

To the Greeks, as to the others, color was associated with light and with divinity. It was endowed with a complexity of symbolism and, because not understood, was elevated to the realm of the divine.

The ancient Greeks, like the Assyrians and Egyptians, used color extensively not only in the art of painting but in all their architecture and sculpture. The remains of the ancient temples were once brilliantly colored.

Because art was an important aspect of pagan

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Greek culture and because classical art glorified the physical form, it was condemned by the early Christians. The iconoclasts destroyed all works of art they could find, but they did not condemn color. On the contrary, the Christian fathers advocated the use of color in the church. Up to the fourteenth century, Christian art was abstract in form, but in color it was rich and glorious.

The mystic Asiatics, the sensuous Greeks and the spiritual Christians all recognized the power of color.

### *Color Is a Symbol*

In addition to its inherent psychological power, color exerts a strong symbolic force which has been implanted in us through tradition. For example, we are conditioned to associate red with festivity, blue with distinction, purple with dignity, green with nature, yellow with sunshine, and so on.

Pink is usually associated with health. We consider a pink complexion a healthy one. People often say, "He is in the pink," meaning that he is in very good health.

We commonly associate colors with outstanding achievements. Colors are used as designations of special merit in awarding honors and prizes. Generally, the first prize is designated by a blue ribbon, the second prize by a red ribbon, the third prize by a yellow ribbon. The armed forces use as awards of

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merit purple, gold, silver, bronze and many color combinations.

Specific colors are used for designating geographic areas. Color standards have been set up as a means of identification. Colors are used as signals and safety devices.

Flags are the symbols of countries. We all know what red, white and blue means to us. Color emblems are used to designate the branches of service in the armed forces. In traffic control, one color means stop, another go.

Colors are used for designating special days. Orange and black symbolize Halloween. Red symbolizes St. Valentine's day. Green is the color of St. Patrick's day. Green and red express the spirit of Christmas, brown symbolizes Thanksgiving, yellow and purple symbolize Easter.

Red denotes patriotism or revolution, love or hatred—all strong emotions, whether heroic or the opposite. Some men paint the town red. A newspaper is filled with red-hot news. When a man is broke, he is in the red (the bookkeeper uses red ink). The politician drags a red herring. We hear of pink tea parties and red-letter days, and we see redcaps and redheads. The bum hasn't a red cent to his name, although he looks through rose-colored glasses. Red is used on drug labels to designate poison.

Blue is synonymous with despair. To have the blue devils once meant being insane. This phrase was in time shortened to "blues" as an expression of

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mental depression. Blue music is mournful. From the "blues" came our blue laws, blue Monday, blue murder, once in a blue moon and cursing a blue streak. The blueblood is one who claims eminent ancestry and whose blood is not the "vulgar" red of the common people.

People refer to a scoundrel as a yellow dog and to a coward as having a yellow streak. Sensational journalism is yellow journalism.

Green is the demon of jealousy, and a person with a green complexion is not a healthy one. The "greener" is an inexperienced worker. The greenhorn is an unsophisticated individual.

White is a symbol of peace and is supposed to soften the heart of the conqueror. To wave the white flag is to surrender.

Black has many of the connotations of blue. Black art means something evil. A black look, black despair, the blackguard, the black sheep, blackball and blackmail—all have bad meanings.

We often use the word color in expressing an attitude. To many people, leading a colorful life means leading a rich and inspiring life. A colorful person is an interesting person.

### *Color Is Geographic*

The Russians use the same word for "beautiful" that they use for "red." To them red and beautiful

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are synonymous. At the same time, the red flag is also the symbol of their social order. Their love for red, however, existed long before they thought of their present form of social organization.

Cultivated Europeans frequently consider bright red vulgar and ostentatious. Many English people and some Americans view red as too rich and gaudy. Victorian tradition demands the more subtle and delicate tints derived by diluting the red.

In the Orient, red is the favorite of all colors. To Hindus and Chinese, red symbolizes life and joy.

Although inherently yellow is a cheerful, sunny color, we also associate it with cheap journalism, with cowardice and deceit. The Russians once (before their social revolution) used yellow to symbolize prostitution, and in Christian tradition it is the color of the robe Judas wore. In China yellow is held to be the most regal of colors.

Blue is liked by most Americans and Europeans. It symbolizes conservatism and reliability. In China a certain value of blue symbolizes death, as black does for us.

In most countries green symbolizes nature and growth. To many people it symbolizes immaturity and inexperience.

To Western civilization white stands for purity and symbolizes delicacy and timidity. Christ is often represented in white, and the white vestments of priests symbolize peace and godliness. In ancient times, white was sacred to the Roman god Jupiter,

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and white animals were sacrificed to him. In the entire Western culture white is the opposite to black. Yet in China white is the color of mourning.

### *Hues Have Personality*

All red hues are stimulating to some degree. The warmer the red, the more aggressive and advancing it is. Love of red is natural. Children and primitive peoples, and also the cultured and sophisticated, are stimulated by red. Yet there are some people who have a strong dislike for red. Such reaction often can be traced to some traumatic childhood experience associated with that color.

Vibrant orange-red and other warm reds are rejected by certain cultural groups as being "in bad taste" because they are associated with strong feelings. However, magenta red (cool) is generally acceptable even to inhibited individuals.

Blue is the coldest of the colors. It is a psychological sedative for people who are inclined to be easily overstimulated, and often it is depressing for the morose type of individual. Therefore persons inclined to melancholy should avoid an overabundance of blue. Most people react more favorably to green-blue than they do to violet-blue.

Yellow produces the sensation of sunlight and warmth, although daylight is itself cold. The psychological reaction to yellow is not as positive as that to

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red or blue, and the slightest change in yellow will render it either cold or warm, soothing or irritating. Hence it is a color that needs careful handling.

We are constantly surrounded by green, and because the color is unconsciously associated with food, nature and growth, it produces the most normal reactions.

Orange is very stimulating. The majority of people do not like orange because its warmth and vibrancy are overstimulating.

Violet and purple, throughout history, have been used as symbols for authority, respect and dignity. Violet or purple is not a common color in nature; rarity adds to its distinctiveness.

The warm colors are yellow, yellow-green, orange, yellow-orange, orange-red, brown, ivory, beige, buff and all other colors that are predominantly yellow and red in hue.

The cold colors are blue, green-blue, blue-green, violet-blue, violet-red, purple and all other colors that are predominantly blue in hue.

### ***Masculine, Feminine and Neuter Colors***

Pure colors can be taken only in small doses. It would be overstimulating for normal people to live in a room of pure red and depressing to spend long periods of time in a blue room. For walls and other large areas, therefore, color is diluted with white and

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neutralized by mixing it with a small amount of its complementary color or with gray.

Although the words red, blue, yellow and green have some generally understood meaning, they do not actually present specific colors because there is a great variety of red, blue, yellow and green values. At best, names—even those of basic colors—are generalizations.

We should remember that the effect of a color depends on its exact value. The effect of a cool red (red and blue) is very different from that of a warm red (red and yellow), while a green-blue will not affect us in the same way as a violet-blue.

Of the pure hues, men prefer the cool colors. Deep blue is first choice. Women generally have a preference for the warmer hues. The specific value—tint, shade or tone—is the more decisive factor in color preference than the hue.

Deep shades of all hues are masculine in character; they appeal mostly to men. Delicate tints have greatest appeal to women.

The psychological effects of each of the six universally basic hues (magenta red, green, orange-red, green-blue, yellow, violet-blue) are greatly modified when they are mixed with other colors.

The addition of white to a warm color renders it cooler as well as lighter. A warm chrome yellow becomes a cool lemon yellow when mixed with white. A vibrating and advancing red, when mixed with a



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large quantity of white, becomes a cool and retreating pink.

A warm red becomes a mild brown when mixed with a small amount of green or with a touch of black.

A deep blue becomes a delicate pastel blue when mixed with a large amount of white. Thus a hue of masculine character is converted into one that is feminine.

The gray that is neither cool nor warm, neither bluish nor reddish, is the perfect neuter.

### *Color Systems*

In the year 1666 Sir Isaac Newton passed a beam of sunlight through a prism of clear glass and demonstrated that light consists of spectrum colors. It was then learned that a rainbow is caused by the dispersion of sunlight by raindrops.

Since Newton's time, many color theories and color systems have been set forth. LeBlond is credited with creating the first color chart based on red, yellow and blue. Helmholtz made some worthwhile findings about the nature of light that led the way to more comprehensive color systems. Hering made an important contribution by recognizing black and white as psychological factors in color, whereas to the physicist, black is no color at all and white is all colors combined. He is also credited with first dis-

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covering that the physiological primaries are red, green, yellow and blue.

In 1905, Albert H. Munsell evolved a workable color system with three color characteristics—hue, value and chroma. Hue designates the pure color (red, blue, yellow, etc.); value denotes the tone of light to dark (white or black added); chroma has reference to the purity or amount of gray (white and black added). Munsell's system is based on ten hues and ten steps of each hue.

The most comprehensive color system introduced in recent years was formulated by Wilhelm Ostwald. This system is the most practical of all the complicated color systems because it incorporates psychological as well as physical factors. It is based on twenty-four hues, and black and white.

Disregarding the early color theories that were based on limited experimentation, we still find color theories that do not agree. Some of the divergent views are purely personal interpretations of color phenomena on the part of authors. However, most of the disagreements arise from the fact that there are different ways of approaching the subject.

The physicist views color as light. The chemist considers color as matter and pigment. The artist and decorator look upon color as a medium for making pictorial arrangements and pleasing patterns. The medical doctor is interested in color as it affects vision and health. And the psychologist studies the influence of color on human character

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and behavior. Each uses the system that is most effective for achieving his end.

Considering the practical functional aspects of color, in mixing pigments we must use a color system based on the primaries yellow, magenta red and green-blue. Every artist knows that with these three hues and white he can make numerous hues, shades, tints and tones.

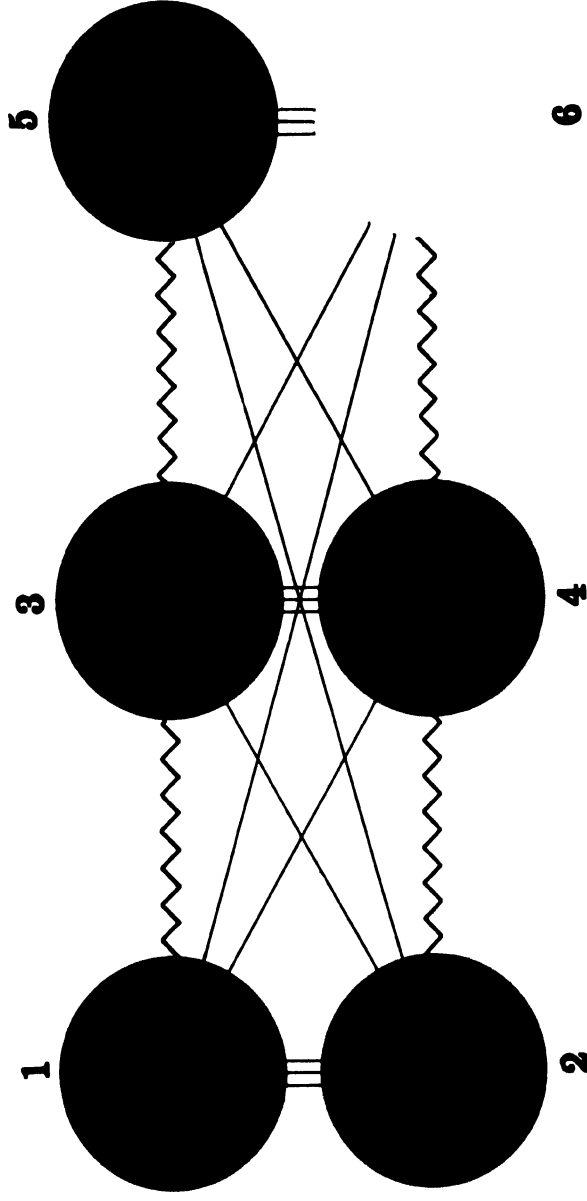
In mixing color light, we must use a system based on orange-red, green and violet-blue as the primaries. Mixing orange-red and green light produces yellow light; thus it is evident that yellow is a secondary color in light, not a primary.

A practical color system is one that is based on the six universal primaries, of which three are the primaries of light and the other three the primaries of pigment. All six hues are visible in the spectrum to the naked eye and each has distinct character.

It is highly significant that the primary colors of light are complementary to the primary colors of pigment. Color demonstrates that light is complementary to matter, that light and matter are interchangeable. And we should be aware of the fact that we live in a world of light and matter.

We should also remember that the complementary relationship between the primary colors of light and those of pigment is physical, physiological and psychological.

Psychologically, green-blue produces sensations and feelings much different from those produced by



The six spectrum colors. Nos. 1, 3 and 5 are the basic components of white light. Nos. 2, 4 and 6 are the primary colors in pigment.



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violet-blue, although the identity of the two colors is often confused.

It should be kept in mind, nevertheless, that green-blue and violet-blue are not to be used together. They add nothing to each other. Quite the contrary, they subtract from each other's effectiveness. This also holds true for orange-red and magenta red.

Colors should be used in complementary pairs. Complementary colors are harmonious, are a balance of one warm and one cold color, each with specific identity.

A color system embraces shades, tints and tones, and color harmony permits the use of a variety of shades, tints and tones of either or both of the complementary hues. White and gray notes can be part of any color plan.



### III

## *What Color Does to You*





## ***Color Is Always Playing a Tune***

Whereas listening to a musical piece can be terminated at will either by walking out of the music hall or by shutting off the radio, we cannot shut off the color arrangement in our homes where we must spend most of our time.

We should be aware of the fact that although we are free to choose or reject music, we have little choice about color because it is always with us. Every object, functional or decorative, has color—good or bad, inspiring or depressing; but it always has a color of some kind. And a color is always playing some tune.

There are people who suffer from mental color blindness just as there are those who suffer from music deafness. Mental color blindness should not be confused with organic or physiological color blindness, any more than music deafness with actual inability to hear. Mental color blindness is not a disease but a mental blocking and a deep-seated emotional inhibition.

Unfortunately, many otherwise normal persons are afflicted with mental color blindness (as with music deafness), and the individuals thus afflicted are denied a vital outlet for both mental exercise and emotional expression.

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However, mental color blindness, like music deafness, can be cured if the person wants to be cured. The most effective way of achieving the cure is to open up the mind and to expose oneself to stimulating color environment.

Mental color blindness is an escape mechanism. It is often caused by the desire to shut the mind and emotions off from the things that surround us. If the home or office environment makes a person feel depressed, he consciously or unconsciously tries to disregard it.

But he cannot shut off his environment. Whether he is conscious of it or not, his environment has a great effect on him in either a negative or a positive way. His surroundings can be inspiring or irritating. They are never neutral.

If the individual who imagines that his environment has no effect upon him will watch his reactions and analyze them, he will come to realize that color surroundings influence his emotions. He will then seek to surround himself with colors that play a pleasant tune for him.

Unfortunately, emotional disturbance caused by wrong color is rarely traced to the source. Many things are blamed for nervousness or moodiness, but not the guilty color.

## WHAT COLOR DOES TO YOU

### *Some Like Their Colors Vibrant*

Primitive peoples have very strong emotional response to color, but they are attracted by pure hues only. Delicate tints are washouts to them, and to some they represent weakness. Many savage tribes associate loud colors and loud noises with manliness and power.

Children, like primitives, are not attracted by delicate tints or deep shades. Baby pink may be a thrill for Mama but it leaves Baby unimpressed. A very hot red may annoy the cultivated sensibilities of the modern mother, but it is a thrill to the two- or three-year-old. Children from the age of one to six are very much intrigued with pure colors. Normal children like red best and blue least.

Some very significant studies have been made on the relationship of color preference to emotional stability and mental hygiene. Many more studies are needed before final conclusions can be drawn. However, it has been observed that children who are emotionally unstable or are given to morbidity choose blue or black as the favorite color. Children who are starved for sunshine prefer yellow, and those in the slum areas where shrubbery is rare are attracted by green.

Try giving a baby two identical toys—one red, the other blue—and nearly always the child will choose the red one. If the contrary happens, you may be

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sure there is a psychological reason. One such reason may be that the child once hurt himself with a red toy. The red color, being associated with pain, becomes unwelcome.

A traumatic experience with a red toy may remain in the unconscious for a lifetime, and that person may for the rest of his life have a dislike for red objects.

Under normal circumstances, the average child prefers the warm colors of the red and yellow family because these colors are vibrant and stimulating. —

Infants can identify only the four physiological primaries. They cannot identify orange or violet. Orange is associated with red or yellow, depending on whether the orange is deep or light. Violet is called blue by the very young (and by some adults as well). If you tell the tot it is violet, not blue, then he is likely to identify blue also as violet.

Children react more instinctively to colors than adults because they have not been influenced by commercial pressures. Nor have they been inhibited by the social taboos that condemn expression of natural feelings.

Men who lead primitive lives, far from modern activities, have a strong need for pure hues. European peasants embroider their festive garments and decorate their houses and household goods with very rich colors.

Farmers paint their barns red to counteract the overdose of green. Tradition says that it is not good

## WHAT COLOR DOES TO YOU

taste to paint the house red, but cultural heritage does not include barns within the scope of aesthetics.

Among the underprivileged of our modern cities, there is a strong craving for pure hues because vibrant colors fill an emotional need. Objects with pure, rich color lend stimulation to people whose lives are drab and monotonous.

### *Balancing Your Color Diet*

It should not be assumed that one color is all a person needs. On the contrary, a mile of red ceases to be stimulating. Maximum color power depends on contrast. The right color is not enough any more than the best bread or the finest cheese is a sufficient diet. Just as our food must be varied, so must the color. Our environment must have a variety of color as of form. The basic major color that fits the personality must have its pinch of salt and pepper.

A predominantly yellow room must have its spots of blue, a predominantly blue room its accents of yellow. In other words, if you are a highly nervous individual who feels very comfortable with blue, it does not mean that you should have nothing but blue in your room.

Blue alone, instead of being soothing, becomes depressing. Normal people must have variety and some stimulation. Yellow accents will provide the variety and stimuli in a blue room; red accents will do the

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same in a green room. Remember that by using complementary colors we follow physiological and psychological principles, as well as physical.

Normally, people react to colors in the same way they do to other stimuli. They generally surround themselves with diluted colors of both cold and warm hues, unconsciously seeking a balanced diet of sedatives and stimulants. Analogous colors are either both warm or both cold, but of the complementary colors, one is always warm and the other cold.

Having a color scheme of two analogous colors, such as orange and yellow-orange (or derivatives of these), is not balancing your color diet. Analogous colors are harmonious because they have a common denominator. Both orange and yellow-orange, for example, contain yellow. But both being warm colors, they provide little contrast visually and insufficient variety in psychological effect.

When a third color is to be used in a color scheme, it is generally advisable that it be a tint or shade of one of the two hues. If your color scheme is predominantly pink (a derivative of red) with rich green accents, the third color can be either a shade of red or a tint of green. If you want to heighten the stimulating effect, a pure red should be used. If the brilliant green is to be softened, a green tint should be introduced.

The use of more than three color values—tones, tints and shades—is permissible. By employing a variety of colors, all of which are derived from com-

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plementary hues, you achieve an effect of both variety and harmony.

The floor covering or rug is an important factor in giving unity to an interior. A harmonious effect can be achieved by having a rug of the same hue as the walls but much deeper in value—a deep green rug with light green walls and a deep blue rug with light blue walls.

A harmonious and unified effect can also be produced by having the rug complementary to the walls. The rug should be of a shade of yellow (brown, tan, beige) for blue walls and a shade of red for green walls.

A light rug with dark furniture or a deep-colored rug with light wood produces a dramatic effect which is pleasing to some people.

The furniture and walls should be either complementary in hue or contrasting in value. If the piece of furniture is complementary in hue to the background, contrast in value is not needed. But if furniture and walls are the same in hue, contrast in value is essential and means that dark furniture should have a light wall and blond furniture a deep background.

By using cool and warm color values in the right proportions you get a balanced color diet and create an atmosphere that is conducive to harmonious and balanced living.

Colors take up no room. The right colors can be made a part of the house furnishings just as easily as



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the wrong colors, and usually at no extra cost. Using colors constructively and getting positive values out of them means using the scientific approach to the subject and recognizing the psychological effects of specific colors.

If you are given to moodiness, if you are likely, for example, to get feelings of depression, you should by all means create for yourself an environment of predominantly warm colors. The main colors in your home should be of the red and yellow families, with only touches of green-blue in the rugs, draperies or furniture coverings.

The small areas of cold color in the furnishings provide complementary values and, by contrast, make the warm color even more vibrant and brilliant. But the small spots of cold color have little effect in themselves next to the predominating warm hue.

Red color can do as much for you under some circumstances as a strong drink. But because the color produces the effect without going through the digestive system, you are not always conscious of the stimulus.

Color is cheaper than liquor. Keep it in mind that right colors cost no more than wrong ones and that they can make a surprisingly great contribution to your general well-being.

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### *The Color Must Be in the Right Place*

Appreciation of beautiful colors is like all other aesthetic appreciation. Like the love for beautiful forms, the love for beautiful colors is influenced by associations.

Color symbolism can be either conscious or unconscious. Through association, a color often expresses a sensation that is completely independent of the inherent color character. For example, the red of a burned skin does not produce an aesthetic sensation.

Appropriateness means proper association, fitness. It means the right place and time. For instance, you may want the lawn to be green, but you would not think of using green cosmetics. You like to look at red lips but not at blood. You choose the most orange-looking oranges in the grocery store, yet as a color, orange is the least popular. Thus we see that the right associations are vital in color preference, and appropriateness is important in color appreciation.

In color-tuning an interior we should always keep in mind the purpose of the room. For example, a bedroom is intended for rest. The bedroom colors should therefore be in delicate tints or tones, soft, calm and serene. A living room, however, can be more dramatic, with contrasting color values and accents of brilliant hues.

## COLORS—WHAT THEY CAN DO FOR YOU

### *Each Color Has a Mate*

Although colors are in the light, color harmonies are in the eye. Although knowledge of color harmony is acquired, color harmony really is a physiological phenomenon. Each color has a mate. Blue and yellow are actually seen through one optic nerve, and green and red through another. The two organs function simultaneously in seeing green-blue and orange-red.

~ The afterimage phenomenon demonstrates the complementary relationship between red and green and between blue and yellow. Looking at one of the two colors brings forth an afterimage of its complement. After looking at green, if you turn your gaze to a white or neutral surface, you see red; after looking at red, you get the sensation of green. And so it is with blue and yellow.

When complementary colors are placed next to each other, the effect is both stimulating and pleasing because the afterimage of one color enhances the other. The blue afterimage from yellow enhances the blue, and vice versa. The red afterimage from green enhances the red, and vice versa.

These visual color phenomena take place for all people except those few who are color blind. And it is worth knowing that color blindness is only in pairs of primary colors, except in the case of partial degeneration of a color nerve. Blindness to red and green

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is much more common than blindness to blue and yellow. Although three to four men out of a hundred are color blind, only one out of three hundred women is thus afflicted.

The following case is an example of the power of the afterimage. A meat market, which had sold the choicest meat products for years, had its display room redecorated, the management anticipating an increase of business as a result. Instead, business began falling off rapidly. All kinds of experts were called in to find out what was wrong. Among them was a color specialist who detected the trouble immediately upon entering the display room.

"Your color scheme is the source of the trouble," this specialist told them. "You have bright yellow walls which produce a blue afterimage. This blue afterimage is carried over to the red meat, causing it to appear purplish, and the customers think the meat is stale or even spoiled." He prescribed a color that would enhance the red in the meat—a blue-green value that is the exact complement to the color of the fresh meat. After that color was applied to the walls, the meat took on a fresh look, the red becoming redder than ever.

The color of an object is an objective reality, although the color would not be there without light. The afterimage, on the other hand, is a purely subjective phenomenon. The afterimage color is only in the person's eyes.

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The phenomenon of the afterimage demonstrates that color contrast is in part objective or physical and in part subjective and physiological.

Because of the afterimage we can have harmonious combinations of a neutral color with a pure hue. A gray looks greenish next to red and reddish next to green; it appears yellowish next to blue and bluish next to yellow, because the complement of the pure hue is added to the gray.

### ***Color Affects Your Appetite***

Color plays an important part in the enjoyment of food. The appetite is conditioned by the sense of sight as well as by the senses of smell and of taste. The enjoyment of eating is governed by the color almost as much as by the taste of the food, as was demonstrated recently at a dinner party given by a lighting engineer.

On the banquet table, when the guests took their seats, were dishes filled with the finest and most appetizing foods. Suddenly the illumination was switched from white to color lights.

The steaks took on a bilious gray color, the celery turned extremely pink, salads were converted into a muddy violet, the green peas looked like oversized black caviar, the milk turned blood-red, the eggs blue, and the coffee a sickly yellow.

Most of the guests immediately lost their ap-

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petites. Those who forced themselves to eat the food became ill.

In short, the dinner was a failure, but the experiment was a success. It demonstrated conclusively that we eat with the eyes as well as with the senses of taste and smell and that color has real power over the digestive system.

### *Color with a Purpose*

We speak of gay colors and somber colors, of colors that depress and colors that give pleasure. We have gone to places that make us feel gloomy, and we have been in others that inspire gaiety. Only few people realize that the colors of the room are largely responsible for the mood.

A noted woman journalist is subject to attacks of melancholia. She says that when she begins to feel the symptoms she goes into a room decorated and lighted with red. After spending some time there she is ready to resume normal activity.

Some time ago a manufacturer redecorated the lunch room in his factory, changing the walls from a peach color to a light blue. The employees began to complain that it was chilly and that they had to wear their coats to lunch. The plant engineer knew that the temperature had not changed because it was thermostatically controlled. A color specialist recommended that the walls be repainted peach and that

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orange slip covers be placed on the chairs. When the warm colors replaced the blue, the complaints ceased.

A football coach used color wisely in fitting up his men's dressing rooms. For the room where they lounged and relaxed, he chose a soft restful blue; for the one where "pep sessions" were held, a stimulating red.

An interesting report is that of a factory where merchandise packed in black boxes was loaded into cars. The workers showed fatigue in the early afternoon and often reported illness. A color specialist visited the plant and suggested painting the boxes a light green. After this was done there were few complaints and absenteeism was cut.

A well known hostess was searching for an idea for an interesting party. A color specialist told her he could prescribe something that would assure her a most successful evening provided she promised not to serve alcoholic drinks the first two hours. She reluctantly agreed to follow his instructions and put magenta light bulbs in every fixture in the house and placed a number of them under the furniture.

The party was a great success, though drinks were not served at all. The hostess reported that husbands made love to their own wives and wives to their husbands. The reason, of course, was that magenta is stimulating and also flattering to the complexion.

Perhaps a little magenta in the home can make a major contribution to happier family relations.

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### *Change the Color Instead of Your Wife*

An unhappy-looking man told a color specialist, whom he knew from schooldays, that his wife had the "blues," that she had hardly talked to him for months and had been consistently morose. He thought perhaps a visit from an old friend might do her some good.

The visit was uneventful. The young wife served tea mechanically and answered inquiries politely. Otherwise she did not utter a word. To the question as to how she liked her apartment she replied that she hated it. That was the only emotional utterance she made the entire evening.

Upon the visitor's departure, the husband thanked him for coming, at the same time betraying disappointment that he had failed to arouse his wife from her lethargy. If anything, he seemed to have aggravated the situation with his constant questioning.

On the following day, the color specialist called his friend and emphatically advised him to redecorate the apartment and to purchase a few small accessories. He urged that the blue walls be changed to a warm tint or tone of red—peach or a neutral orange. He insisted that all black objects be removed and that a number of pictures, ceramics, vases and pieces of sculpture, predominantly red or orange, be added to the furnishings.

At first the young woman was indifferent to the



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alterations, but in a few days she began to take enthusiastic interest in the arrangement of the new pieces. Within a month she again appeared to be a normal, happy wife.

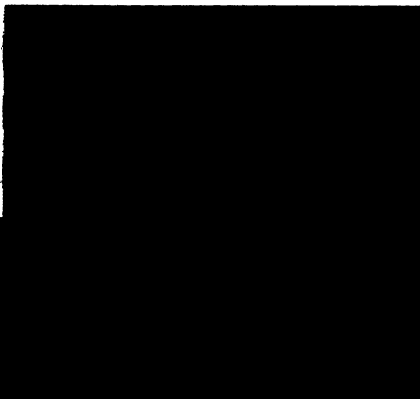
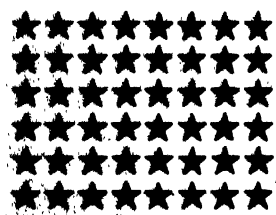
This case history is an excellent demonstration of the psychological power of colors. The blue-and-black environment undoubtedly aggravated the woman's psychic illness, while the red surroundings unquestionably helped her toward normal behavior and happiness.

The following is a case where red had a negative effect. A young lady married a man who had a beautifully furnished apartment which she had visited on numerous occasions during their engagement. In preparation for the mistress of the house, the prospective husband called in an interior decorator who painted the blue walls orange and made red the dominant color. He wanted to surprise the lady—and he succeeded.

She had always been an overly excitable person, and the hot color scheme did not help her to control her temperamental outbursts. Her sudden and consistently erratic behavior was attributed to many causes. However, a change back to blue was followed by the return of a more rational disposition.

The power of color is again demonstrated in the case of a young wife who, in order to be with her veteran husband, lived in the only place available, a drab shack which offered no possibilities for colorful decorating. In spite of her happiness in being re-





Afterimage. Look at the flag for about 30 seconds. Turn your gaze to the black dot, and you will see the American flag.

## WHAT COLOR DOES TO YOU

united with her husband, she became morose and complained of frequent abdominal pains for which her doctor could find no explanation.

After five months of increasing melancholy, she found relief only after she had become busily engaged in planning a color scheme for the new home they eventually found.

Perhaps there is a lesson here for other husbands. To the man who contemplates leaving his spouse because she is melancholic or overly nervous, I say, "Change the color scheme in your home and keep your wife."

### *Wearing the Rainbow*

The clothes-conscious blonde who wears blue knows the value of wearing the right color. The blue, being complementary to yellow, makes her blond hair look lighter and richer.

The brunette who has mastered the art of choosing the most flattering wardrobe wears light warm colors of the yellow family. Such colors as beige, light brown and cocoa provide favorable contrast for the brunette.

If the titian-haired woman really wants to look like a redhead, green should be her color. Green, being complementary to red, will make titian hair scintillate. The redhead should not wear red because it will detract from her hair, make it rusty looking.

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The brown-haired and medium-complexioned miss need use the least skill in choosing her colors. Either warm or cool colors will provide some complementary contrast. She is therefore free to choose colors that are psychologically satisfying to herself or that meet the needs of the occasion. The colors of the rainbow are hers to wear to suit her mood or purpose.

The beauty-alert woman realizes that hair is but one factor in choosing apparel colors. The color of her eyes, the tone of her skin, the cosmetics she wears also are to be considered when she selects her clothes.

### *White Makes You Look Pure*

White has favorable symbolic meaning and therefore has some psychological value. In its favor is its association with cleanliness and purity. Inherently, white is neither sedative nor stimulating, but it can be warm or cool.

There is no such thing as pure white, as there is no pure black, because the purest white absorbs a little light as the blackest black reflects some light.

There are yellowish whites and bluish whites in numerous tonal values. The cool, bluish kind of white is generally preferable. A white gown looks best in cool or blue light.

A white gown is often flattering because it reflects

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light more than any other color and illuminates the color of the skin. However, the luminosity of white is most advantageous when combined with another color of brilliant hue or with black. The effect of cleanliness and the symbolism of purity are contributing factors.

Light blondes, however, do not benefit from wearing white, since they do not need its illuminating effect and the white does not give enough contrast to light skin.

While a white gown is flattering to some complexions, it does not display the figure to best advantage.

### ***Black Makes You Look Beautiful***

The inherent psychological power of black is negative. However, black plays an important role by negation; that is, it makes adjacent colors vibrant and more beautiful.

Black is basically depressing; it has no attraction power; it absorbs tremendous amounts of light. But a black background is excellent for showing up the brilliancy of other colors. A black gown is therefore very flattering to a woman with a naturally clear complexion or well-applied cosmetics.

Although a black dress in itself is not stimulating, it does make a wonderfully effective background for bright accessories. And what is even more important,

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black apparel makes the skin look pinker, richer and clearer, and outlines the contours of the figure.

If you have a clear complexion, you are safe in wearing black without accessories. It will cause your face to look much lighter by contrast. If you have a drab complexion, you can still wear black if you put a touch of white near the face. If you are very dark-complexioned, however, it is advisable for you to wear some colorful accessories with a black gown.

### ***Gray Makes You Look Like You Are***

Gray is neutral. It has no effect whatever on adjacent colors, so it is an ideal background for showing the true values of all pure hues.

Mix black and white and you have gray, a very drab gray, a perfect neuter. A perfectly gray dress won't do anything for you or against you. It won't accent your figure as black will. But maybe you don't want your figure accentuated. It won't enhance your complexion. You may desire this neutral effect too. It will not reflect light into your face as white will. That also may be what you wish.

If you want a neutral-colored garment but not one that is neuter and completely devoid of some effect, choose a blue-gray or beige-gray or violet-gray. In other words, get a garment that has been dyed with colors, not with a black-base gray.

Pick a gray that has some distinct effect, of coolness

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or warmth—a gray in which the blue or the yellow, the green or the red has left its traces and enough remains of it to be seen and to create a positive sensation. Such a gray with brilliantly colored accessories will still make you look very much like you are, but it will provide a more favorable background for you.

### *When the Female Uses Color Power*

The gentle sex is not nearly so inhibited as the robust male. If a woman cannot or does not choose to overwhelm the male of her choice with an undulating form, she adopts as her tool a scintillating color scheme.

Consciously or unconsciously, the civilized female, like her more primitive sister, uses color as bait. And you don't have to be a color specialist to know that the bait is effective.

The human female steps out in her vibrating suit of armor and gets the male of her choice so overpowered emotionally that he completely loses his reason and mistakes the dazzle for excellent character, love and devotion.

Since women compete with each other for male attention, garments with colors that have strong attention-getting power are used for sports and for more formal wear as well. The highly vibrating



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colors, in addition to being strong attention-getters, are also most stimulating in character.

However, there are also the more subtle females who gown themselves in pastels that produce the impression of delicacy and innocence and, because they are less obvious, are sometimes more effective.

Women often display a great deal of knowledge of color in using it as a tool. They use colors not only because of the power inherent in them, but also as a means of bringing out their own natural high points of attraction.

Blondes wear much blue to make their hair appear more golden. Brunettes wear light warm tints to give their hair deeper and richer value. And red-heads wear green to make the hair appear much redder than it is.

The girls may not know that they are practicing the principles of color harmony, but nonetheless they get the results they want. Many modern girls have mastered enough knowledge of color power to convert an average appearance into ravishing beauty.

Whether a black gown is worn to present a conservative and formal demeanor or because it shows off the curves of the figure so effectively, color spotting is used as a means of guiding the (male) eye to the "right" places. Brooches, earrings, ribbons and necklaces are the highlighting media for guiding the gaze.

Whether she decides to use attire of a color with great visibility and attention-getting power, whether

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she chooses the more subtle approach by dressing in delicate pastels, or whether she decides to use color and dazzle stones for highlighting her best points, a woman invariably is aware that she must use some kind of red on her lips and on the finger nails. The smart and alert modern woman does not dare walk out of her house without wearing this minimum of stimulating color. Even for formal occasions, red lipstick and red nail polish are a necessary minimum of color power which she does not dare to ignore.

When the temperature permits foot exposure, she increases the color power by applying the red to her toe nails also.

Of course, the use of red on the lips has been a feminine necessity for many years. Members of the delicate sex take to lipstick like savages to war paint. The red makes the lips vibrate much more enchantingly, and it is the modern girl's prime weapon.

Lipstick and red painted nails are often an unbeatable combination. On special occasions a woman may find it necessary to use even greater quantities of enticing color. And the modern mademoiselle knows how to use additional color power when the occasion demands.

### *Where the Male Dares to Use Color*

Pastel-colored slacks and multicolored checks are very much in fashion for men in California. Holly-

## COLORS—WHAT THEY CAN DO FOR YOU

wood executives and actors are often informal and colorful in attire as well as in temperament.

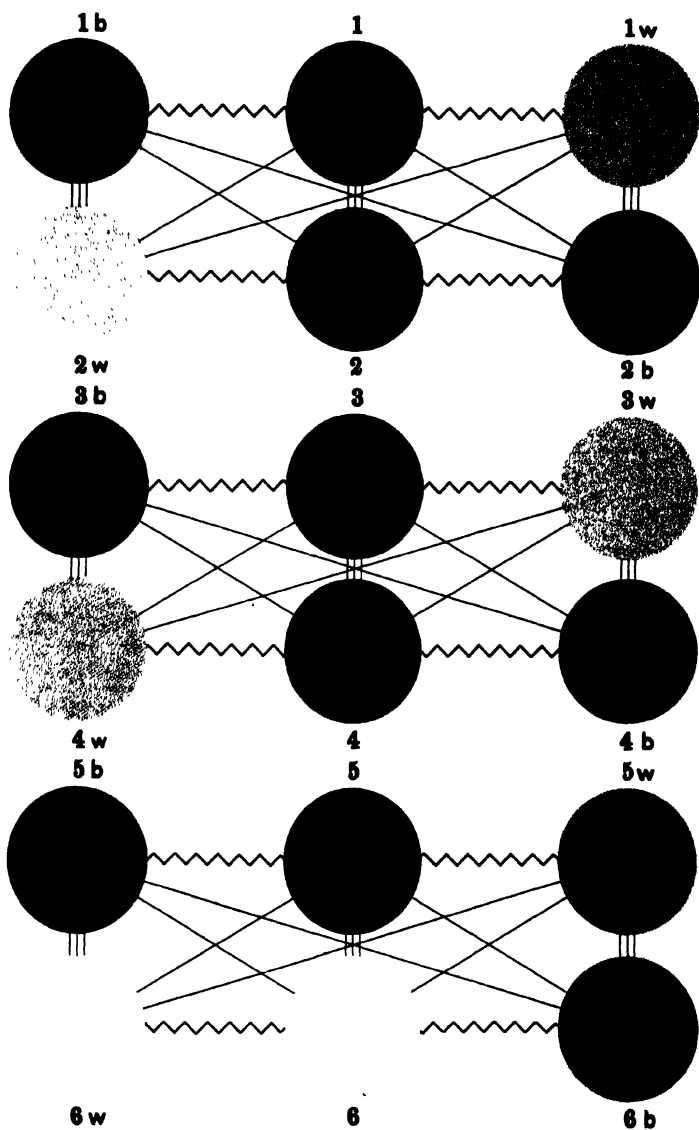
The average American man of a Midwestern or Eastern city or an urban European wouldn't think of such a display of color in trousers or shirts. However, the usual color inhibition often disappears when it comes to the neck. Otherwise inhibited men think nothing of putting on the loudest and most garish looking ties. They'll spend from five to fifty dollars for prints, batiks or hand-painted jobs. And it's the color they're paying for.

These flamboyant cravats frequently do not accent or complement the color of the suit. Too often the neckpiece has no relationship to the rest of the attire. And since there is no aesthetic objective in using an unrelated combination of brilliant hues, there must be a psychological reason.

Of course, we should not fail to recognize that to some degree social factors are involved, such as fashion, prestige and a desire to show wealth. Since such cravats are obviously expensive, they come into the same category with diamond rings and diamond-studded watches.

But there also is a deeper reason for such behavior in the choice of colors. And that reason is not the same in all individuals.

Some proud males use the tie to guide attention to the face or to a particular physiognomical feature—pronounced masculine chin, strong mouth, classic nose or deep brown eyes. Others use the cravat as a



Color chart of six hues of the spectrum, with one tint

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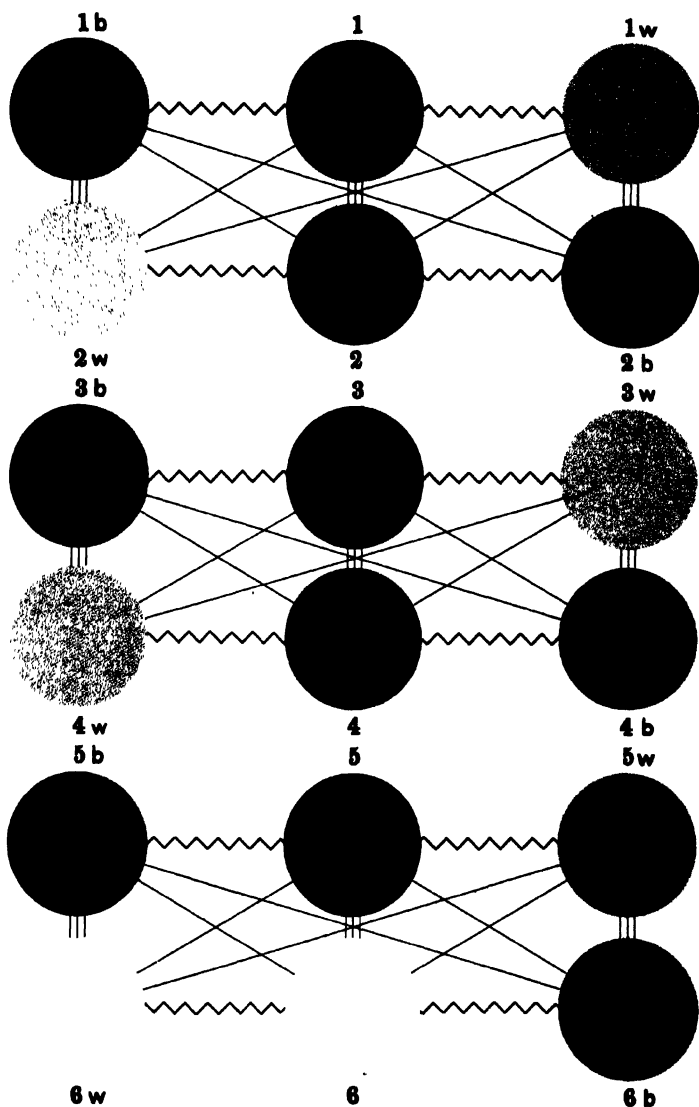
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Color chart of six hues of the spectrum, with one tint and one shade of each hue.



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decoy—as a means of drawing attention away from the figure that is too fat or too thin (in their own minds, if not actually). But the majority of men are impulsive enough to permit themselves just a little emotional outlet by way of their ties.

The sensible businessman cannot permit himself to get color drunk, but a small straight shot (from the dye vat) around the neck doesn't hurt. It will attract a little attention, but not too much, he reasons.

A few members of the male sex even go a step further. They do not think that color stimulus around the neck is enough and they reinforce themselves with color power around their ankles. Those are the brave mortals. But too often there is no harmonious relationship between the socks and the tie, and the dual color outburst becomes shocking instead of stimulating. That's what comes of bravery that is not backed up with knowledge.

The average businessman feels it is necessary for him to surround himself with drab colors and attire himself in grays, deep blue shades or deadened browns. If he has a good tailor he will get a pinstriped worsted to make him look taller or a check to make him look broader. But the color is always neutral because the man of affairs must create the impression of dignity.

He may betray his hunger for color in normal surroundings with a colorful necktie. But he completely discards his masquerade of practicality and dignity when he leaves his office and escapes into nature.



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These same practical men who are always guarding their dignity seem transformed when they decide to lead a primitive life in the wilds. Red-checked mackinaws take the place of drab suits. Brilliant scarves become a passion and the red blanket a must, supposedly as protection against being mistaken for a bird or a deer.

It becomes evident that under a primitive environment man returns to his natural state with no strict pattern for behavior, no conscious desire to impress, no defense mechanism. These usually restrained individuals put on garb that outshines that of the native woodsmen. They become like savages and children in their color extravagance.

Of course the reason for the color outburst is that the man has been emotionally starved and this is his first "square meal" of color in six or twelve months.

When the causes of the inhibitions are removed, when his instinct gets the opportunity to express itself, man is an entirely different animal from the one who is burdened with artificially imposed social and commercial pressures.

In modern circumstances, in our present society, man has a dual nature, and he expresses it in his behavior with color.

IV  
*Color in Art*



## ***Color Is as Old as Art***

Color is as old as art, and art is as old as the human race. Prehistoric man used color. The peoples of ancient civilizations employed color in expressing their feelings and ideas.

The Chinese, the Hindus, the African natives and the Westerners all use color in art and in decoration to express their emotions and to make their environment more pleasant and inspiring.

Symbolism in art and in color plays a much greater part in Oriental civilization than it does in Western cultures. Even today Orientals are much more interested in the spirit of the subject, the mood, the feeling or impression, than in the factual, realistic aspects.

In China and in India, art and color are associated with the emotional life rather than with material existence. Western countries concentrate more on the physical aspects of life. However, art and color exert upon us a great influence of which we are not aware. Although consciously we may give great recognition only to material matters which we consider realistic, unconsciously we are greatly affected by art and color.

When we choose a packaged food product or a tube of toothpaste, we are often expressing color and

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design preference, because it has been found that we are in the habit of choosing the package with the most appealing design.

More than five thousand years ago the Egyptians used yellow, blue and green pigments, and an earthen red like our burnt sienna or Venetian red. They had these colors in ink and in paint.

It is interesting to note that although they developed colors to a great degree they had no knowledge of perspective, which is the art of drawing solid objects on a two-dimensional or plane surface so as to produce the appearance of the actual object as viewed from a specific point.

In other words, the Egyptians did not know how to portray three dimensions on a two-dimensional surface, but they did know how to express ideas in color.

Oriental still do not bother about perspective. And not until the fifteenth century did European artists begin to introduce perspective into their paintings. But no matter what kind of art form a people had, color was a vital part of their art expression.

### ***Color in Early Christian Art***

Christian civilization inherited its art, like its religion, from the Orient through Byzantium. Early Christianity was a revolutionary movement against

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Greco-Roman civilization. It rejected both the bad and the good of Greco-Roman art.

The Greeks and later the Romans worshiped nature and physical beauty. They glorified the human body and were in every way earthy. The Hebraic-Christian movement was a revolt against the physical. It put emphasis on the spiritual and shunned the beauty of the human form.

The Mosaic commandment "Thou shalt not make graven images" was taken literally by the early Christian fathers, and they forbade the realistic representation of the human figure in art. But they championed the color symbolism of Byzantine culture. The human figure became a lifeless abstract symbol, but color was very lively indeed. Pure hues and rich tints were abundant, although the figures looked as if they suffered from paralysis.

Early Christian art is full of expressionless visages and distorted features. The complexions of the saints are brown and green and look very unhealthy, but the figures are always dressed in gay-colored robes. The colors, like the vines and doves in early Christian art, had symbolic meaning.

Giotto was the first great painter to break away from the raw-colored, stiff Byzantine style. He began to use realistic form and neutralized color values. Giotto was the forerunner of the Renaissance, which was a revival of classic culture. Again the human body became a most important feature in art, but

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color lost its brilliance and some of its symbolic significance.

Fresco became a popular medium among Florentine painters, and fresco does not lend itself to brilliant or subtle coloring.

Masaccio was the first painter actually to master form and perspective. But he did it at the expense of color.

Michelangelo reached the greatest heights in expressing three-dimensional form on a two-dimensional surface, minus color effectiveness. His color seems insignificant when one views his mighty, sculpturesque figures.

Leonardo da Vinci and Raphael Sanzio used colors that were only a little more brilliant than Michelangelo's, but their form was quite a bit less solid.

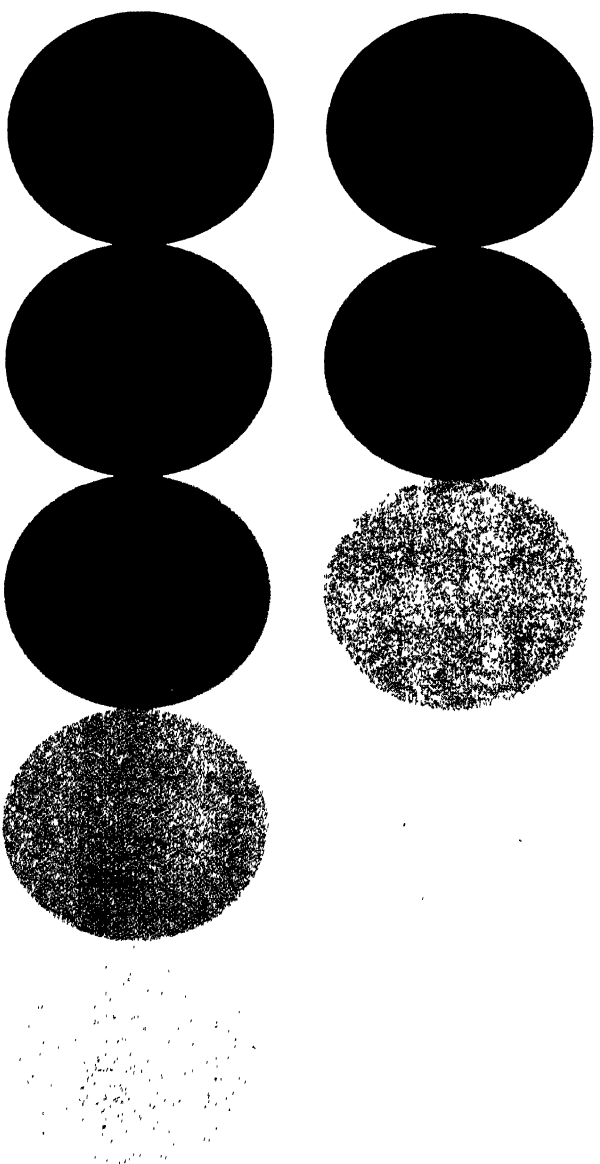
As a whole, Florentine Renaissance art was highly intellectual, pseudo-religious and lacking in sensuousness.

### *Color in Venetian Art*

Although the great period of Venetian art was almost contemporaneous with the Florentine, it is entirely different in character. Whereas Florence was a center of learning and ecclesiasticism, Venice was a city of merchants who loved splendor and enjoyed color. Venice, a worldly city, inspired a sen-







*Complementaries, orange-red and green-blue, each in five values, from pure hue to delicate tint.*

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suous type of art. Venetians demanded highly stimulating, colorful art.

Titian is the outstanding painter of the Venetian Renaissance period. His art is neither classic nor intellectual nor religious but is primarily sensuous.

Titian was most of all interested in achieving scintillating colors and delicate textures. His art is not austere like Michelangelo's but highly colorful. Titian, like the other great Venetian painters, considered color the most important element of art. Line and even form were sacrificed in order to attain the ultimate in color subtleties.

Titian's technique was spontaneous. He handled his brushes with great freedom and vigor. None of the stiffness characterizing the painting of the early Christian period is found in Titian's art. Nor are his colors ever flat or cold. His color quality is warm and unique. It breathes. It is scintillating.

Giorgione was Titian's only equal in the Venice of about 1500. His style is very much like Titian's. His compositions also are lyrical and his figures voluptuous. The colors melt into each other and his canvases are radiant. Color and light are the chief qualities of Giorgione's art, not intellectualism or ecclesiasticism. Line and form were considered by him, as by Titian, second in importance to color.

Neither Giorgione's nor Titian's paintings should ever be viewed in black and white reproduction. Without the color their paintings are formless and weak. Venetian art means color. The fresco colors of

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Michelangelo and Raphael seem dead when compared to the luscious vibrating glazes of these Venetians.

Titian's and Giorgione's paintings do not portray supermen like Michelangelo's, nor sentiments and ideals like Leonardo da Vinci's. Their canvases express a lust for light and life, for softness and sensuousness. All these elements are expressed through a masterful technique of glazing one color value on top of another. In Venetian art, the shadows as well as the lights of the figures and portraits for the first time have vibrant color.

### *A Spaniard Talks in Color*

The Spaniards had none of the love for the colorful and voluptuous, and their senses none of the refinement, that the Venetians possessed. Spanish art expresses cruelty, flattery, mysticism and a special kind of puritanism.

Like Spanish life, Spanish art is composed of deep dark shadows and bleak yellow-white light. In Spain things were either black or white, art included.

Spanish sensuality expressed itself in mysticism, and its realism in brutality and gaudiness.

El Greco, more than any other artist, expressed the tormenting contradictions of Spain. El Greco was only half a Spaniard; by birth he was a Greek who absorbed the cruel and mystic environment of To-

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ledo. Even today he is known as "the Greek," El Greco. His real name is Domenicos Theotocopoulos.

El Greco is undoubtedly one of the world's greatest artists. His works are superb in composition and unusual in form, but they are especially significant in their characteristic colors.

In El Greco's time nothing was known of the science of psychology, and light was thought to be white and shade black. It is therefore quite amazing that El Greco's art should show awareness of the psychological as well as the physical factors of light.

It is recorded that El Greco tasted the culture that was Venice. He studied under Tintoretto and Titian and learned much from them about color.

El Greco was able to see the seventeenth century Spaniards as the Spaniards could not normally see themselves. His paintings are mystical, but perhaps El Greco himself was not a mystic at all.

El Greco was a scholar and a very practical person. He was a master in conducting his business. He was a superb craftsman as his works demonstrate. He was a man of social influence, and he seems to have known the mortal subjects he painted—not as a purely subjective, temperamental painter knows them, but as a psychiatrist does.

Although El Greco earned an ample living from his painting, he was not loved by the Spaniards because they knew that he did not flatter them, and they did not consider him one of themselves.

Knowing something about the life of El Greco we

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can conclude that the bloodless, green-gray visages on his canvases do not represent subjective impressions, as some artists and critics would like us to believe, but are objective, conscious depictions of decadence.

More than any other artist, El Greco depicted suffering humanity in contrast to the beauty that comes from the sun. Although he did not know that colors come from the sun, he did know that they are pleasing to the senses, stimulating, healthy and normal, and just the opposite in character from the pain and misery inflicted by men on one another.

It is very significant that the faces on El Greco's canvases have no warmth and no pleasing color but that the draperies do have warmth and color.

The contrast between the glowing colors of the costumes and the diseased-looking complexions of the saints was no doubt intended to convey what it does convey very emphatically—that the bodies and souls were sick but that the raiment was very colorful and stimulating.

El Greco's morbid looking figures are depictions of neurotic individuals who are surrounded by a colorfully ecstatic world which they do not notice.

Looking at El Greco's art from a psychoanalytical point of view, we can only conclude that it was conscious and deliberate, not subjective and impulsive. A subjective person could not possibly consistently couple miserable gray-green flesh with beautifully scintillating colors outside of the flesh. El Greco was

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the psychoanalyst of his time. He depicted his environment with great skill and juxtaposed on his canvases the miserable human with the beautiful universal.

El Greco painted the Spaniards while they were torn between the search for God and the search for gold. That wretched inner struggle is superbly and clearly expressed in Greco's forms and composition, but most emphatically in his use of colors.

### *Black Shadows and White Lights*

Velasquez was a great seventeenth century Spanish painter who did not show much interest in his subject's soul or character. There is nothing that is either sensual or spiritual in his art. He treated his subjects as matter-of-fact creatures, as human forms without any other human attributes.

Light and shadow were Velasquez's major interests, but he did not know what constitutes light. His shadows are black and his highlights white. His compositions are static, his figures stiff. His colors are mere tonalities of brown and black with a little pale pink and an occasional red thrown in. However, his draftsmanship and his depiction of the human form are superb.

In Holland, Rembrandt painted great masterpieces of portraiture in brown shadows and white light. Although he spent his life studying the atmos-

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pheric quality in light, he never learned that color comes from light. The highlights in his remarkable portraits are dazzling white and the shadows deep browns and blacks.

The great Flemish artist Peter Paul Rubens painted the human skin in luscious natural color. But color to him was only an aspect of the nature of the epidermis. He was not concerned with color as an emotional end in itself.

Rubens painted the nude body as an organic entity, not as a symbol of anything else. His female nudes are statements of physical fact, not glorifications of the human form. Neither color nor form was his aesthetic objective.

To El Greco, organic nature was ugly, only color was beautiful. To Rubens, organic nature was beautiful and color was a part of it.

Rubens is one of the greatest of pictorial composers. Although his paintings contain much brown shading they also have an abundance of vermilion and pink, and the browns are golden.

Most of the other Spanish, Dutch and Flemish painters preferred to hide their subjects between deep brown shadows and dazzling, often flat, white highlights.

The French artists of the Bourbon school were busy producing canvases filled with artificially colored marionettes or with porcelain-like nudes. The Bourbon king had a taste for white-skinned damsels, and Boucher produced them. Art was rele-

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gated to the bedroom where there was very little light and no color.

The neo-Classicists, the outstanding one of whom was David, discarded deep warm shadows and warm white lights and substituted cold marble-gray shadows with cold marble-white lights.

Even the Romanticist Delacroix, who had a great love for brilliant colors, painted deep, dark shadows. And Corot, one of the greatest of French landscape painters, produced brown shadows and cool silver lights.

The French realist Courbet, who insisted on painting nature as it is, also produced canvases full of brown-black.

Chiaroscuro (light and shade) was the principle that most painters used after the beginning of the Renaissance. This principle was followed by the Spanish and the Flemish, the Dutch and the French painters. The Bourbon artists, the neo-Classicists, the Romanticists and the Realists differed in many ways, but none knew the nature of light and color.

### ***The Impressionists Painted Light***

Although the physicist Sir Isaac Newton discovered the nature of color in 1666, about two centuries passed before artists became aware of spectrum colors.

The French Impressionists—Monet, Renoir, Pis-



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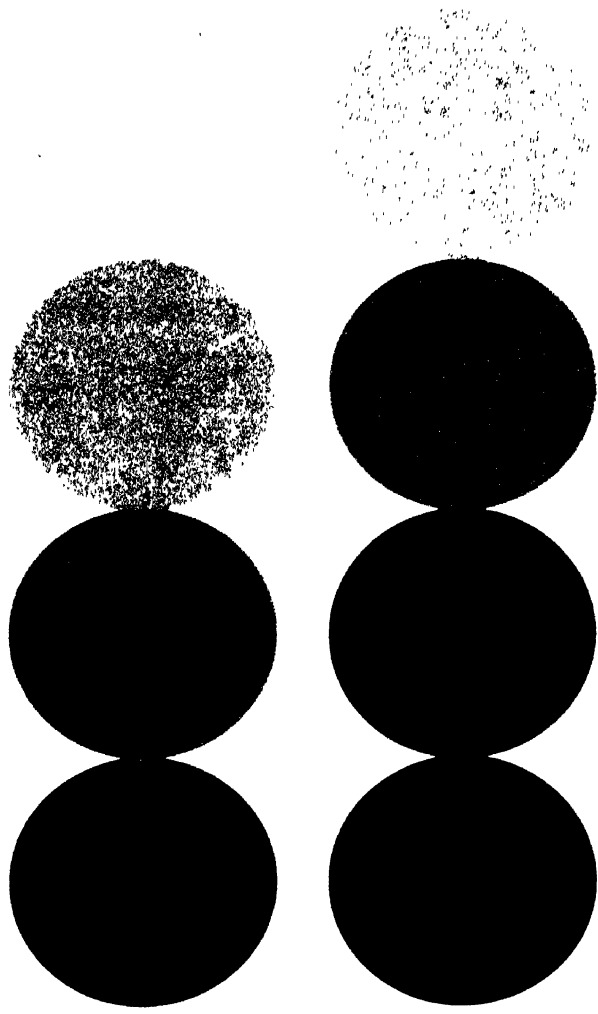
saro, Sisley, Degas, Morisot and Cassatt—were the first painters to put Newton's findings into practice.

Impressionism is based on the scientific principle that light is color and, since everything is bathed in light, everything is immersed in color. The Impressionist recognizes the fact that the appearance of a form is never the same. The form is modified in its visual character by the reflections from other forms surrounding it. And it changes with the time of day and the angle of the light that strikes it. Since an object is different each time we see it, we should paint it as we see it at a particular time.

The Impressionists painted everything with the colors of the sun, that is, with spectrum colors. They eliminated the brown earth colors and black, and they took their canvases from their studios and went out to paint from nature.

The Impressionists introduced into their paintings the law of complementary colors and began to use freely the additive method of mixing colors in the eye (as in process printing), while traditionally colors are made by subtraction (that is, by mixing the pigments). The Impressionist puts small strokes of pigment next to each other. At a certain distance the colors merge and the eye sees them as one mixed color.

Since the people were educated to the belief that art and science were poles apart, they ridiculed the Impressionists and accused them of being too scientific and therefore not artists at all. However, the



Complementaries, green and magenta red, each in five values, from pure hue to delicate tint.



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Impressionist movement gained momentum and became an established school of art.

Impressionism is primarily a technique for expressing a scientific principle of light, and it denies a solid three-dimensional world.

The Impressionists sacrificed form in order to gain atmospheric quality. Although their paintings often look like framed pieces of tweed woolen, they nevertheless made a major contribution to art. They broke away from an art world of black, brown, gray and white and demonstrated that light consists of colors.

The Impressionists freed art from the established academies and from classic tradition and set the pace for further progress in the aesthetics of color.

### *The Nature of Expressionism*

The scientific principle of Impressionism in a few years created a reaction. Expressionism, the most unscientific and disorganized form of art, followed Impressionism.

The Impressionists were interested in nature, in the sun, in color. The Expressionists are interested in themselves.

Color, form and composition are considered purely subjective values by the Expressionists. An Expressionist painter paints not for an audience but for himself—so he claims—and yet he seeks to earn a living by the sale of his works. What is more, he

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often succeeds in earning a very comfortable living. Witness Dali.

In an age of science when people are becoming greatly aware of the significance of orderliness, social consciousness and communal feeling, the Expressionists are striving to impress upon the public superindividualistic, incomprehensible and unorganized works.

In an age when we are putting emotion to scientific analysis and have learned to measure color sensations and sound sensations in relation to man's emotional needs and mental stability, many Expressionists are peddling their egocentric and socially perverted wares.

Often the Expressionist work of art is the product of an emotionally unstable personality. Such works should not be ridiculed since they may be sincere efforts and expressions of genuine feelings.

The tragedy is not that unorganized, socially useless, unaesthetic creations are produced, but that they are accepted by recognized social and cultural leaders as works of art.

The ill-inspired, incoherent and often childlike dabbings are hung in museums next to the works of Rembrandt, Titian, Rubens, Winslow Homer and Thomas Hart Benton. In some places the Benton paintings are kept out, but those of the Expressionists are put on the walls.

The Expressionist's colors are strictly personal. The universal laws of color harmony, the principles

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of composition and proportioned form are completely disregarded by him. The function or purpose of the picture is never considered. "This is my masterpiece and you should buy it" is the attitude of the typical Expressionist.

The Expressionist does not consider personal expression as inherent in art but makes it an end in itself. Other schools of art consider the communication of an idea or emotion as the objective and view self-expression as an inevitable accompaniment of the creative process.

Exponents of Modernist art have found a new technique of communicating the contents of a work of art to the public. They use words. They use books to explain pictures.

If a picture fails to communicate universal, understandable feeling, books are written in abstract and abstruse language justifying its color discord, formlessness and lack of composition on the ground that they are evidence of esoteric, original and highly advanced concepts. The books do not explain anything, but many people have a tendency to glorify and often even to deify that which they do not understand.

Demagogues have been called saints. So also pictorial monstrosities have been put across as masterpieces. If a crooked politician can be palmed off as a civic-minded leader, why can't a quack in art be put over as a great producer of highly aesthetic works?



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Cézanne was simple and naïve. He had no worldly or cultural background. In the normal course of things he would have starved, because no one wanted his pictures. But, luckily, he inherited a small fortune and could be indifferent to the art market.

In his youth Cézanne had a close friendship with the author and journalist Emile Zola, but in later years Zola could not stand Cézanne's neurotic nature and social backwardness, and the friendship faded.

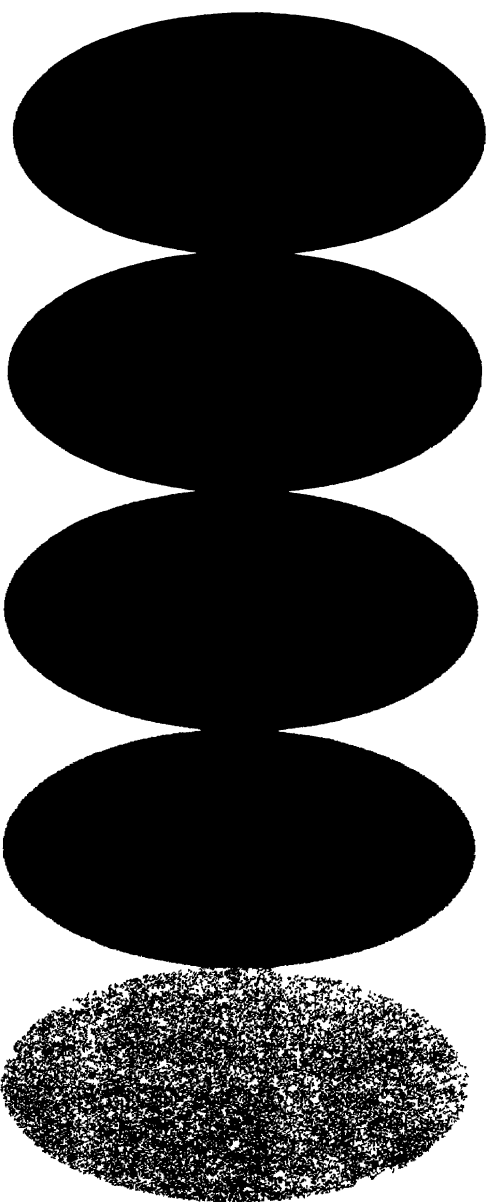
Cézanne, the man of such poor personality, is the great idol of the Expressionists and is considered by them the greatest colorist of all times.

The Expressionists claim that Cézanne was inspired by El Greco and by Delacroix. But where El Greco painted huge ecclesiastical compositions full of drama and power and Delacroix created highly dramatic, romantic figure compositions, Cézanne specialized in painting apples and bottles.

Cézanne's champions give all sorts of mystical reasons for this choice of models, but the fact is that Cézanne had neither a trained mind nor a trained hand. He was not conditioned to seeing and translating onto the canvas complicated forms such as human figures. He was an extremely slow worker because he was not sure of himself. He had no mastery of his medium. He had no knowledge of human anatomy. But he did understand the nature of color.

Since Cézanne was concerned only with himself, with his own little sensations, he cared not what the subject was. His limited intelligence, lack of techni-





*Complementaries, violet-blue and yellow, each in five values, from pure hue to delicate tint.*

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cal knowledge and skill, and neurotic nature produced an art with all of the artist's weaknesses.

Nevertheless, Cézanne discovered an important aesthetic principle which he fully succeeded in using in his canvases. He gave form to Impressionism. 1

Cézanne learned to use broken color from Pissarro and Renoir. He realized the significance of painting with the colors of light and of producing a feeling of atmosphere, but he also wanted to produce three-dimensional form. In other words, he sought to paint solidity as well as light and atmosphere.

Cézanne combined the merits of the old masters with those of the Impressionists. His paintings do have a sense of structure as well as natural color and a feeling of atmospheric quality.

Cézanne's apples vibrate with color, but at the same time they have solid planes and geometric structure. The shade as well as the light is pregnant with subtly vibrant color, yet mass and form are also evident. This untutored, neurotic Frenchman co-ordinated natural light with natural form and gave birth to a new school of art.

Another great neurotic of art, second only to Cézanne in fame, is Vincent Van Gogh, a Dutchman associated with French Modernism. Van Gogh was ignorant, fanatic and extremely neurotic. His neuroses later developed into insanity, yet Van Gogh is one of the greatest colorists in modern art.

Van Gogh did not understand the nature of color. He probably never heard of additive color-mixing

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and sunlight consisting of colors. If he did hear about spectrum color, he had no idea what it meant. He was too poor to get any kind of education, cultural or technical, but he had genius and perseverance.

Art was a religion to Van Gogh, and color, not form, was to him the essence of art. He recognized the physical world. But the material world he was permitted to know was not a very pretty one.

Unlike Cézanne, Van Gogh was interested in humanity. He loved people although the people did not shower him with their love. He was deeply affected by human misery, but he could find no help for his own.

Van Gogh's paintings obviously were created when the artist was in a state of frenzy. They betray a tortured soul and a greatly pained personality. His colors and his semiflat forms are in violent action and strong contrast. His hues are vivid and unusual. They reveal a deep, unsatisfied longing for sunlight and express great emotional strain. Although Van Gogh is extremely subjective, he communicates intense feelings in the universal language of color.

Gauguin is another highly acclaimed Modernist. He set out to lead a primitive life in order to be able to create pure art. However, he was as out of place in Tahiti as he was in Paris. He produced canvases with exotic colors and primitive forms, and although his forms betray complete ignorance of anatomic

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structure, his colors express a very subjective nature and an abnormally developed libido.

Henri Rousseau, still another highly revered Modernist, had a passion for green and shows a childlike conception of nature.

Picasso, the giant of present-day Expressionism, has produced some works that give ample evidence of intelligence, education, talent and skill. He is also a socially conscious and well-organized person.

Why should a man who can create mature and significant art produce childlike images and graphic monstrosities? Obviously, social and economic as well as psychological elements are involved. We know that social or world conditions are factors, and we can often find the economic motivations for such actions. But Picasso's changing choice of colors in successive periods tells us that there is a deep emotional basis for this kind of painting. When a man has blue dominating his canvases, then switches to a distinct rose, then to another hue, there definitely is a psychological reason.

Economic motivation and social pressures generally are sufficient reason for producing any kind of oddity—freakish styles in clothes (women's, especially), medical cure-alls and "unusual" works of art. But Picasso's choice of colors in his various periods betrays some very deep emotional instability of which the artist may be completely unconscious.

There are many Modernists who are not neurotic. Some are superegotists and others are supermer-

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chandisers. One student of human behavior, a professional psychologist, has said that if the Modernists are not neurotic, many buyers of their paintings certainly are.

Matisse is another contemporary giant of French Modernist art. He is anything but neurotic. In character he is more like a modern businessman and very unlike a Bohemian artist.

Matisse's paintings and drawings are primitive, childlike and naïve. His colors are raw and his line harsh, yet Matisse, the man, is anything but naïve. Perhaps he thinks his audience is.

Minus the expensive frames, Matisse's paintings would fit perfectly into an exhibition of grammar school art. Yet Matisse does everything else like a highly cultivated adult. Again we must look for sociological, economic and psychological reasons for this type of art.

I know many Modernist artists who are normal, intelligent human beings in every activity, but when it comes to painting they become children, or primitive Africans, or ancient Assyrians, Persians or Greeks.

Of course there are those who paint to please the exhibition juries, museum directors and art dealers, as manufacturers produce goods for the market. The difference is that a manufacturer prides himself on turning out a product that pleases the customer. The Expressionist artist denies that he paints his pictures with the customer in mind.

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The outstanding characteristic of Expressionist color is that it is always unusual and extreme. It is either weird, raw or muddy. It is always unique and often bizarre. It is not intended to be normal in character and is not supposed to have any specific purpose or to fit into any specific place.

What greatness, what inspiration, what gratification is there in hanging on one's walls the morbid, depressing, incoherent products that pass as Modernist art? There could not possibly be any greatness or inspiration, but gratification there is. There is the gratification of feeling that, in owning up-to-date Modernist pieces, one joins the social elite. The purchase of such works of art, like the creation of such works of art, is the action of the ego asserting itself above all.

### *The Character of American Art*

Present-day American artists can generally be divided into three classes:

1. Those who follow the footsteps of the French Expressionists—the disciples of Picasso, Matisse, Cézanne, Van Gogh. These are the artists who have their canvases hung in the so-called “progressive” museums and displayed on the walls (or put into closets) in the homes of so-called collectors of modern art.

2. The painters of the American scene—a group



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who proclaim that art should be purely national or regional in character. A few of these are great painters. Some of them are superillustrators, but most are subillustrators.

3. Those who live in a world of the past and emulate Rembrandt, Velasquez, David or any other old master who, they believe, painted photographically.

There is still a fourth group of painters, but they can hardly be called artists. They are the depictees of flowers, porcelain ducks, Venetian glass and Italian antiques.

The colors of the Modernists are reflections of the personalities of the artists. These can be divided into psychological groupings.

(1) There are the morbid Modernists who see and depict life in black, deep purple and bleak stark white. (2) There are those who smear lots of violent reds and yellows on their canvases as if they had been color starved for years. (3) And there are the Modernists who insist on very natural color superimposed on distorted or mutilated forms.

Many of the painters of the American scene have a passion for green and brown. Some like more green and others more brown.

The worshipers of the old masters show their inhibitions by their preference for shades of brown, although they insist—and some sincerely believe—that by painting they release their inhibitions.

America has some great artists. Thomas Benton is the greatest of American painters. His art is real and

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powerful. It expresses and interprets American life, not in a narrow manner, but in a free, honest and universally meaningful style. His paintings take no sides, contain no propaganda for any point of view, but they mirror the good and the bad, the true and the false, the commonplace and the rare of American life. His is an art of social communication, not limited to subjective expression.

Benton's style is distinctive and original and his technique masterful. His form has none of the neo-Classic or childlike simplicity of Picasso. It is three-dimensional, solid and full of powerful motion.

Benton's color is strong, rich, distinct and, at the same time, meaningful. Not only are his colors rich in hue, but they are also reinforced with tonality (black and white content in color). It is the tonality that is the basis for the solidity of the form and endows his composition with the effect of relief and natural character. His color is as wholesome as his form is normal.

Benton is neither purist nor propagandist. He is neither completely subjective nor thoroughly objective (actually, neither is psychologically possible). He is a composer of forms, an interpreter of his environment. He expresses universally aesthetic principles within the limitations of the social scene as grasped by his own personality and put on a two-dimensional surface with masterful craftsmanship.

The other painters who come near or are in line with Benton's stature are two Mexicans, Orozco and

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Rivera. Like Benton, they make use of universal principles in composing their great murals and easel paintings. They interpret the social scene. Each expresses his interpretation of the universal principles of orderliness and depicts the social scene in an individual style and with great mastery of the painting medium.

Benton's paintings, Rivera's and Orozco's do not resemble one another in any way except in social significance and in greatness of achievement. The most important thing the three have in common is that their art is not created in cluttered studios with the sole purpose of being sold to snobs. Their art is created for all the people and is truly democratic art.

The two Mexicans are equal masters with Benton in expressing three-dimensional solid form and in arranging figures on large spaces.

Rivera's palette is not a limited one. His choice of colors shows no inhibitions. He is master of color as he is of form and composition. Rivera's interpretation of the social scene is both subjective and pregnant with propaganda and idealism. It promotes an ideal (rather than fact) with all emotional means at the painter's disposal—form, color and arrangement.

Orozco is a master of composition. His style is the most individualistic of the three painters, and his form is more characteristically Mexican than Rivera's. His colors are earthy rather than sunny. Like his subjects, they express sorrow and great suffering.

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His compositions are full of contrasting values and powerful forms. But Orozco shows no knowledge of the nature of light. He learned nothing from the Impressionists, and his colors are uninspiring.

### *Subjective and Objective Art*

Subjective expression is present in all creative art. In choice of color, in form, in composition and in manner of handling the medium, the artist's individuality reveals itself.

It is the subjective character of art that makes the works of Michelangelo, Raphael, Titian, El Greco, Delacroix, Courbet, Monet, Benton and Orozco so distinctive.

Painting permits a maximum of subjective expression. The artist starts with a blank canvas. He is obliged to create every form and every color, and, as he does this, he incorporates his subjective nature into his work.

The artist's form, concept and composition as well as his colors bear the stamp of his personality. If the concept is great and emotionally stimulating, if the composition gives unity to the concept, and if the color is emotionally gratifying to the beholder, we know that it is a great personality that created the graphic work.

There are not many painters, however, who are great artists. Very few in the history of art have had

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great concepts, few have been great composers and not many were great colorists. Only a few have had distinctive personalities that were inspiring or elevating.

Most artists are followers, as are people in general. There were dozens of artists in Michelangelo's day who painted and carved marble as he did. There were dozens of artists who painted like Rembrandt. And there are still numerous artists who paint like Cézanne or like Monet, and some who copy Picasso and Matisse. These painters are neither very subjective nor very creative.

As a medium, oil paint offers the greatest possibilities for expressing subjective taste in color as well as in form. Water color is not too limiting, although more so than oil paint.

The most recent medium for self-expression is photography. For over two decades, black and white photography has been the popular medium of expression for numerous amateurs. And there are many more amateur photographers, of course, than amateur painters.

Black and white photography provides an opportunity for some subjective expression in form and in composition.

Color photography has recently been developed so that it can be used by amateurs with just a little basic knowledge of the principles of photography. This medium provides much more stimulating aesthetic food than black and white for thousands of

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emotionally starved businessmen and professional people.

Photography, however, even in color, does not offer the possibilities for self-expression that painting does. It is a mechano-chemical medium that is essentially objective in character.

The photographer can modify his subject to some extent. He can choose his angle of view. He can determine the perspective. He can compose to a considerable degree within the existing limitations of the subject. But forms he must take as he finds them. He can of course still reject undesirable subjects.

When it comes to color, the subjective expression of the photographer is even more limited than it is in form and composition. The emulsion and the camera are the major factors in determining the color character. The type of artificial lighting and the time of day, however, are variable factors.

Within these limitations the photographer still has a large area for subjective expression in seeking (instead of creating) the desirable forms, in composing from a desirable angle of view and in determining a specific perspective. The skillful photographer does have the opportunity to create considerably personalized and aesthetically significant pictorial works.

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### *Self-Expression, Art and Society*

Man's ability to express ideas and deep feelings is the most important characteristic that separates him from the rest of the animal kingdom. When a person is denied self-expression, he loses the highest attribute of a human being.

When people fight for freedom or when they fear loss of freedom, they mean the freedom of self-expression. This passion for freedom is very subjective. Although people organize into groups to guard their freedom or to fight for it, each person in the group nevertheless is thinking of, or feeling for, his own freedom for self-expression.

A person's subjective expression is closely related to the ego. His desire to express himself is the ego's need to assert itself. And this expression of the ego is not always beneficial to himself or to the community.

An example of the ego's tendency to self-defeat is that of the man who will risk losing a great sum of money, the love of a dear one or a devoted friend, rather than admit he is wrong. People do such things every day.

The ego becomes antisocial when it asserts itself at the expense of other people or when it imposes itself on and squelches the self-expression of others.

Since the expression of the ego can be destructive and antisocial, society puts controls over it. Even the

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most primitive kind of society has certain controls over self-expression.

The prehistoric tribes had a code of behavior. Uncivilized African and South American tribes have codes of behavior that limit the self-expression of individuals. The Ten Commandments are the basis for our code of behavior, which incorporates numerous rules and restrictions.

A person may believe that he just must express himself by stealing from his neighbor. But society has set up rules prohibiting him from doing that and has provided punishments for those who disregard the code and carry through this personal desire.

Modern society regulates many of our subjective impulses. We are told how fast we can drive our cars, in what seasons and where we can hunt. We are told that we must send our children to school and that we must pay taxes. Thus our subjective natures are regulated and limitless self-expression is denied us.

Various forms of society put diverse limitations on self-expression. At the present time we in the United States have the greatest number of freedoms. This means that we Americans can express our subjective natures in more ways than any other people in the world.

It is possible for every society to provide socially useful outlets for the expression of the ego. In a craft society, every craftsman was to a considerable degree an artist. The tailor, the cobbler, or the coach-maker put the stamp of his personality into his work.



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The artisan did not work only for money. From his handiwork he also gained distinction. He took pride in his product. It had the stamp of his individuality. It expressed his creative nature, his inner self, his ego.

And all this subjective expression was social in nature as well as self-gratifying because the artisan produced goods for his community.

In our industrial society, most work in itself provides no emotional gratification. But the money which the worker receives for his labor can be used as a means for gratifying his emotional, mental and physical needs and wants.

There is no emotional satisfaction in working on an assembly line, turning the same kind of bolt hundreds of times a day. There is no self-expression in the modern industrial plant. However, an industrial society provides leisure time in which self-expression can and must be a major element. In fact, for a great number of people creative art is one of the few spheres in which self-expression is now possible.

Everyone can express himself emotionally through design and color. The amateur artist, like the professional, should aim to satisfy his emotional needs.

Man's emotional needs, however, are not wholly self-determined. The ego asserts itself only in relation to the group. The individual seeks recognition from the group.

Although subjective, amateur art, like professional

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art, must be communicative. It does not necessarily have to express an idea, it need not depict realistically a natural subject, but it has to produce pleasant sensations.

Varied forms and colors that are harmonious and unified are aesthetically satisfying. Chaotic forms and colors normally jar our senses. We can force ourselves to accept discords in forms, colors and sounds, but we are neither stimulated nor soothed by them.

Ten artists painting the same subject will produce ten versions of the subject's color and form. Each painter will modify the colors and forms in accordance with his own personality. He will do this even if he is not conscious of desiring to be subjective or different from the others.

However, the amateur artist is influenced by masters. His subjectivity is not very evident. His style is not distinctive and his technique not masterful. The amateur painter cannot expect to get the wide audience appreciation of the professional artist. But he can get full satisfaction from self-expression in a stimulating medium, and some audience approval too.

Every artist, professional or amateur, wants his works to be pleasing to others. The artist may say that he creates only for himself. He may consciously think so, but unconsciously he craves recognition, whether combined with material compensation or not. Man's subjective nature must have external ap-

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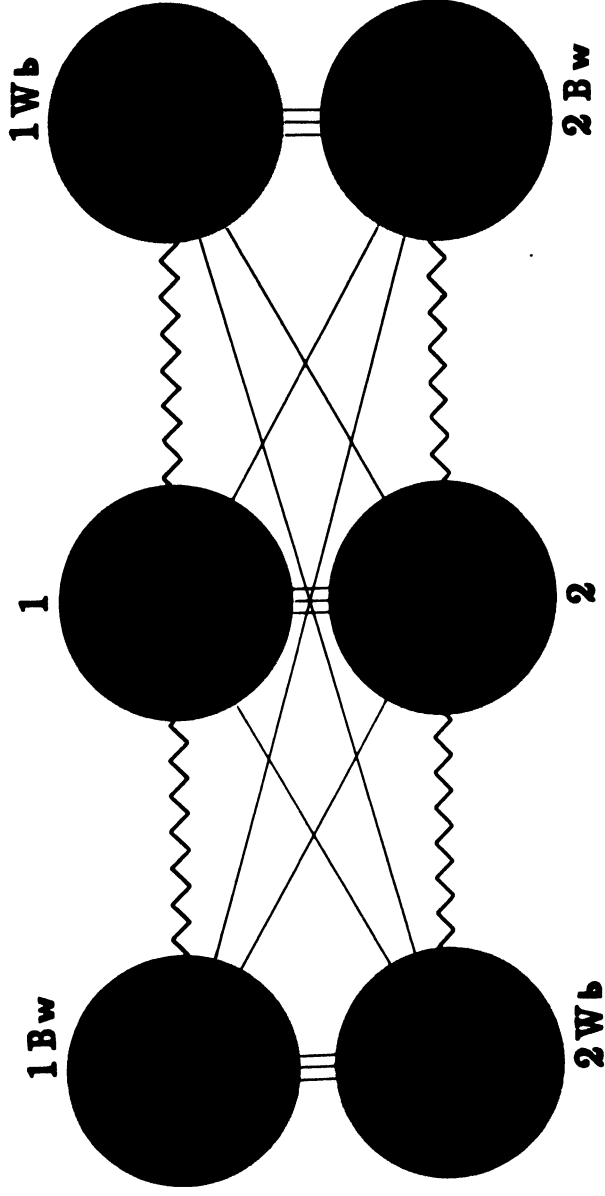
proval. Such is the character of all living creatures. Man craves attention as do the dog and the cat.

A work of art, to be a true and fulfilling expression, must be a bridge between the creator and the beholder.

Normally, people demand proportion, harmony, unity in art just as they do in all other aspects of their everyday life, both at home and in the community. Therefore, just as society must have a pattern of organization, so a work of art must conform to definite rules of composition. The same fundamentals that govern the organization of groups of people also govern the organization of forms and colors. Harmony and unity are as important in the composition of a work of art as they are in the organization of a social unit or state.

Distorted forms and bizarre patterns may attract attention (and for that reason are effective in advertising); they may shock and arouse curiosity, but they do not produce pleasing sensations or elevating ideas. Panels or canvases with unorganized forms and muddy or gaudy discordant colors do not give aesthetic pleasure.

A conscious desire to be different on the part of many artists results in works completely devoid of universal principles and worthwhile communicative elements. Some works of what is called Modernist art succeed in communicating subjective feelings and emotional disturbance, but fail to produce pleasurable sensations.



Complementaries, orange-red and green-blue, of pure hue and in two tones, one light and one deep.



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While an individual's disturbed emotions, whether expressed on canvas or in words, may arouse sympathy and interest, they will not evoke aesthetic sensations or feelings. We are, however, aesthetically stimulated by related patterns, proportional forms and harmonious colors.

### *Appreciating Art*

Perceptions are based on association, and we have to condition ourselves to appreciate works of art. Those who are able to associate a work of art with the subject only have no real conception of the character of the work of art. In order to have a true conception and full appreciation of a painting, we must be able to make associations with numerous other art works. The elements of medium, technique and style as well as color must be given consideration.

A painting by Titian takes on increased meaning when we (consciously or unconsciously) compare it with a painting by Tintoretto, Raphael or Michelangelo. A Cézanne takes on a different meaning when we are familiar with the works of Delacroix, Courbet and Monet.

The work of a contemporary painter means much more if we can recognize the style and technique and identify the artist without looking at the signature.

Color is one of the most important elements in

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choosing a painting for the home. The pictures should provide the accents for the entire color plan of the interior.

Increased emotional gratification and intellectual fulfillment are gained if, in addition to having color that fits your emotional needs, the work of art also possesses other aesthetic attributes.

Stimulating form, arousing composition, an interesting style and masterful technique give much satisfaction to those who have been fortunate enough to be educated in the realm of art.

A fine work of art expresses the personality of the artist in its color, form, composition, style and technique. This artist's personality becomes a part of the household when his picture is put on the wall. To identify oneself with the great is always gratifying.

V

*Color in Interiors*



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## ***Function and Aesthetics***

If we give the matter any thought, we realize that more effort and money are spent for the psychological or aesthetic aspects of the home than for the physical. However, there really is no sharp division between the psychological and the physical. The two are interdependent; emotional stimuli cause physical reactions, and physical conditions produce emotional reactions.

Traditional concepts lead us to believe that aesthetic elements are separate from physical factors. Many people still classify aesthetic values as frills and purely physical objects as practical. However, the public is gradually beginning to realize that the beauty of an article increases its efficiency and that design is a physical factor in performance and, at the same time, an aesthetic factor in appearance.

We now realize that physical function is closely related to aesthetic form. For example, the principle of streamlining gives the automobile and airplane additional speed as well as beauty. And in furniture, design is a factor in psychological effect as well as in physical character.

The primary function of a chair is to be sat in. Anything that contributes to the comfort of sitting in the chair adds to the functional value. The mod-

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ern chair of simplified design is smooth and spacious, and therefore is most functional, whereas the traditional carved decoration that annoys the sitter decreases the functional value of the chair.

The second purpose of a chair is to be pleasing to the eye. Modern simple furniture design is passive in character. It is smooth and soft and produces an atmosphere of restfulness.

### *We Go Home to Relax*

Because modern life is fast and full of turmoil, the present-day home should be a place for rest and relaxation. We now find most of our entertainment outside the home, in the theater, concert hall or club. We go home to relax. And we relax best in an environment of soft colors and simple forms.

The radio provides stimulating entertainment which we can shut off at will. But brilliantly colored flowered designs and carved woodwork cannot be turned on and off. And these do not produce a restful atmosphere.

In a craft society, intricacy was an important psychological factor. Elaborate, highly stimulating designs met the needs of a tranquil life and an inactive society. Fine embroidered linens and multicolored rugs were the aesthetic symbols of the leisure classes which were distinct from the simple and crude craftwork of the peasant masses.

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In the craft society, intricate and richly colored design had not only aesthetic quality but also social distinction. It was an economic value and a symbol of prestige.

### *The Home Today*

In an industrial society such as ours, intricate design and multicolored decorations have no place. They have no relationship to the tempo and character of modern life. Our society is characterized by numerous synthetic materials, streamlined cars and huge industrial plants that produce articles by the million for the benefit of all the people.

Intricate designs do not fit our methods for producing goods any more than they meet the psychological needs of the modern home.

Many of us still look upon intricate design as beautiful because we still think with craft minds; that is, our thought processes are based on craft standards.

Modern aesthetic as well as industrial standards are expressed in simplicity of form and pattern. Truly modern furniture is basically static in form with soft, smooth, simple, passive patterns. Modern furniture should be as relaxing to the eye as to the body. It should not dazzle.

The pictures in the room, however, may be highly dramatic. We can admire them at will. We cannot

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avoid the chairs and tables in a room. Furniture, therefore, should be as unobtrusive as possible. It should not create an unconscious fear of colliding against sharp appendages or of sitting on the thorny roses with which the upholstery is decorated.

The smoky, sooty atmosphere of the modern city also calls for simplicity of form. Simple and smooth furniture gathers less dust than ornate wood carving and is easily and quickly cleaned.

Modern furniture, free from elaborate carving and ornate patterns, is comfortable. It also meets the psychological needs of modern life by being soothing and relaxing, and it fulfills present-day standards of cleanliness and hygiene.

It is natural and psychologically basic for a simple craft society to find pleasure in intricacy. It is just as natural and psychologically basic for a complex industrial society to find pleasure in simplicity.

### *Color in the Home*

In addition to appropriate form and pattern, the modern home should have the colors that meet the psychological needs of the occupants.

Generally, we know instinctively that pure hues in large areas are either overstimulating or depressing. For our home interiors, therefore, we choose diluted warm colors because they are only mildly

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stimulating, and we use diluted cool colors because they are relaxing instead of depressing.

Color choice, however, is often based on social, cultural and economic factors.

You do not always disregard the social element. Your neighbor's opinion often will affect you. The taste of the community may influence your color choice.

Your early upbringing and educational and cultural background are important factors in your choice of color. For example, you may have been taught in childhood that pink is a sissy color or that red is in bad taste.

Cost is often the reason for not having the right color in the home. You may feel that you want furniture of blond wood, but you find it too costly; or you may think you should have a few red pieces, but they are priced much higher than the dark brown ones. Thus for economic reasons your house is furnished in dark brown. Economy incentives also are often responsible for atrocious colors in clothes as well as in the home.

We often find highly nervous people acquiring strongly stimulating colors and people who should have a stimulating environment surrounding themselves with cold and depressing blues because such colors are in fashion.

If you are of average emotional stability and are guided by your natural reactions to colors, you will get colors that meet your emotional needs. You are



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not apt to choose pure hues in great quantities because you will find them psychologically overwhelming. You will find a strong blue room depressing, a vivid yellow room eye- and head-splitting, a brilliant red room overstimulating and a leaf green room boring.

Then there is the reflection factor. If you want your room to be light, you will choose light tints. A deep shade will give the room atmosphere, but it takes away light.

Another factor to be considered is that red appears closer than blue, and thus a red-tinted room seems smaller than a blue-tinted room. Also, shades advance and make a room look smaller, whereas tints recede and lend spaciousness to the interior.

Still another point to consider in choosing colors for home interiors is the kind of light you are getting. It is not generally advisable to have blue predominate in a room that has only northern exposure. And it is not often wise to have yellow as the major color in a room in which there is abundant sunlight.

Then there is the purpose of the room. For your bedroom, you will no doubt want colors that are very soft and relaxing. In your living room, you may wish to have somewhat richer and more contrasting color values that are gay and conducive to some activity.

Brilliant colors should go into baby's room. They should be distinct physiological primaries. Unfortunately, few mothers are aware that delicate pinks

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and pastel blues are meaningless to baby and that brilliant red gives the greatest thrill to the tot.

The most important factor of all in planning colors for your home is the psychological one. If you are of nervous disposition, predominantly cool colors will be beneficial. If you are likely to suffer from frequent periods of melancholy, by all means surround yourself with an abundance of colors that are warm and stimulating. For most people, it is advisable to have both cool and warm tints, tones and shades, but even in such cases, either the warm or the cool should predominate.

Specific color values should be used that meet the psychological needs of the occupant and the lighting and dimensional aspects of the interior.

And the room should have accents of the complementary hue. A predominantly blue room should have yellow accents, a yellow room blue accents; a pink room should be accented with green, and a room that is predominantly in green tints should have red accents. The accents can be in pictures, drapery patterns, furniture upholstery, vases and ceramic pieces. Although the accent of complementary hue should dominate, other hues do not have to be excluded from the setting.

Pictures provide the best accents because their distribution over the room can be controlled and because they can incorporate colors analogous to the setting as well as complementary accents. They also generally provide additional aesthetic value.

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### *Color in Private Establishments*

Someone once said, "You should not judge a book by its cover." Perhaps you shouldn't, but you do. Book jackets and covers are major factors in stimulating sales. The outside of a building is like the jacket of a book. It is the first thing the public sees. The exterior makes the first impression, good or bad. And the first impression is often a lasting one.

It is therefore important to color-tune the outside of a building. Whenever possible, the color on the outside should be an organic part of the material.

The type of construction and the kind of work done inside the building are important factors in planning the most effective color scheme for the outside.

Hotels to this day, if not drab, are gaudily decorated. So far, there has been no psychologically planned use of color in hotels.

Size of room, cold or warm lighting, purpose of the room are not studied by the average decorator. The decorator's primary object is to be different, to be original, regardless of the psychological and physical factors involved.

Decorators do make a distinction between a living room, a dining room and bedroom, but only in considering the accessories they introduce into the room. The psychological aspects of the color, design

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and arrangement are not considered by the average interior decorator.

Clubhouses, like hotels, are treated subjectively by many decorators. Here, too, originality is often the only objective. Terrain, purpose of structure, functional aspects of architectural design are frequently disregarded.

What would the scientific approach in the treatment of hotel and club interiors accomplish? Rooms with northern (cold) light could be given an atmosphere of warmth by applying warm (red or yellow base) colors to the walls. Rooms having an overabundance of sunlight could have their walls treated in cool colors (derivatives of blue or green-blue). These colors would, of course, be specific tones, not just any blue or green-blue or just any red or yellow.

If the room has poor light, the color would be mixed to a delicate tone in order to get the maximum light reflection. If too much light enters the room, deep, light-absorbing colors would be used.

Color and design can be made stimulating in the lobby and conducive to enjoyable eating in the dining room.

The size of a room, its purpose and illumination should always be studied and analyzed. The psychological needs of the occupants should be given primary consideration, and the purely personal taste of the decorator should be subordinated.

And because in private establishments each room

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has to meet the emotional needs of many people, it is advisable to use tones instead of tints because tones are less specific in hue and not as decisive in their psychological effect. In other words, such rooms should be neither over-stimulating nor too sedative in character.

### *Environment in Industrial Plants*

Industry has spent, and continues to spend, fortunes on personnel work and on time-and-motion studies. Industrial leaders are well aware that employee morale is a vital factor in modern industrial production. The personnel department of the industrial plant of today has been created primarily for the purpose of building and maintaining maximum morale among the employees. Tools and machines have been repeatedly redesigned and improved for the purpose of saving time. High morale and time-saving mean increased production.

Constructive personnel work and improved tools make important contributions to production, but plant environment is another great factor in efficiency, a factor that is frequently ignored.

We know now that eye fatigue and complaints of headache can be caused by highly reflecting walls and work benches, by color afterimage and by lighting that is too weak or too glaring. Scientifically applied colors or finishes not only cut down disturbing

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elements but also produce a favorable psychological effect.

The scientifically chosen hue, of appropriate tone or right neutral value, is a potent psychological factor in raising worker morale, whereas the wrong color (there is no such thing as "no color"—psychologically, black, white and gray are all colors) inevitably lowers the morale of workers.

Right colors are silent music to the personnel. Wrong colors irritate and disturb. By right colors we mean colors that are of specific hue and value for a specific purpose.

We have learned that color has a definite effect on human behavior. The time has now come when we can direct that psychological power to meet our needs in the industrial plant.

### *Color in the Plant*

All people who are not color blind see objects by contrast in brightness and by contrast in hue. Color blind persons see only contrast in brightness.

Insufficient contrast causes eye fatigue and slows up production. Too much contrast is just as dangerous as too little because the eye must constantly adapt itself to extreme changes in light reflection. This also causes undue eye fatigue.

The right degree of contrast in the working area is very important. The handling of white or brilliant

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metal objects against a black background is just as injurious to the eyes as the handling of a black object on a black background or of an aluminum piece on an aluminum or white work table.

In other words, the contrast ratio on the working area must be just right to provide maximum visibility without extreme eye adaptation.

Afterimage is a menace in a place of work. It also is often responsible for drop in production. Many complaints of headaches and numerous reports of "spots before the eyes" are caused by the phenomenon known as afterimage. This, we should remember, means that when a person concentrates on a color and then turns his eyes to a neutral or white surface he sees the complement of the color he had been concentrating on. If he works on a yellow object, he will see blue afterimages. From a green object, there will appear red afterimages.

Afterimage interference can be avoided only by color-tuning the plant—by treating it with complementary hues of specific values.

In addition to the neutralized colors of the right hue and value on walls, floor, ceiling, work tables and machines, a set of colors of high saturation—pure, loud colors—should be applied to all dangerous machine parts.

Yellow and black are the best colors where quick attention is essential and where seeing at a distance is a factor. This is the most effective combination for indicating hazards in plant interiors as well as for







Home interior in six color plans, each with a specific visual and psychological effect.

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marking highways and for designating curbs and dead ends.

Red should be used for identifying fire-fighting equipment because it has long been established as a symbol for fire-fighting.

In order to keep a man continually impressed with the fact that he is operating a dangerous machine, it is advisable that orange paint be applied to or near the machine's hazardous parts.

Orange consists of a mixture of yellow and red and therefore has some of the high visibility of yellow and some of the danger symbolism and stimulating effect of red. Orange is a very sharp, aggressive, stimulating color. It gives the operator constant warning of dangerous moving parts.

The business executive would find it wise purely on a profit-and-loss basis to give consideration to his plant environment. How much does it cost him to have a plant with black or white walls, with drab cast iron machines and with dirty brown-gray inspection tables? After considering the two following examples, that question will not be so difficult to answer.

Two employees come to work in a bad mood because of quarrels at home. The plant environment depresses them still further, and their productivity is low. Four employees complain of headaches because the white walls create glare. They are not very productive either. Five employees handle material that looks much like their machine, and they have

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negative psychological effect and absorbs a good deal of light which could be used to great advantage by the workers.

In many types of work, good visibility is essential from below as well as from above. An appropriate color value on the floor provides the needed brightness for reflecting light and, at the same time, has great psychological value.

Work tables present psychological and visibility problems. The working surface of the table can easily become a means for increasing production merely by treating it with a hue of the right value.

The color on the body of the machine should be complementary to the color at the working area, so as to achieve the contrast necessary for good visibility and at the same time eliminate the possibility of after image difficulties.

### ***Light in the Plant***

Seeing incorporates five elements—eyesight, light, contrast, size and time.

Normal eyesight or good vision achieved with the aid of glasses is essential in all work situations where critical seeing is called for.

Natural light changes with the weather and is either too strong or too weak. Artificial illumination is superior because it can be controlled and channeled to meet the needs of specific work situations.

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For work requiring precision, such as engraving, from 50 to 100 foot-candles of light should be used.

For inspection work, art work or sewing, from 25 to 50 foot-candles are recommended.

For office, classroom or general shop work, from 10 to 20 foot-candles are required.

For packing or gathering large objects, from 5 to 10 foot-candles are sufficient.

Working with contrasting colors does not require as much light as working with colors lacking in contrast. For example, you need much more light for sewing brown cloth with brown thread than for sewing brown cloth with white or light green thread.

It is commonly recognized that it is more difficult to see a small object than a large one. It is also evident that the finer the work, the more illumination is required.

Salaries paid to employees and profits made on manufactured goods are determined by the time it takes to produce the product. Time is a very important factor in inspecting goods. The time element is an important factor in every working situation.

Good eyesight (natural or corrected), proper lighting and correct contrast are major factors in determining the speed of work such as inspection.

Inefficient lighting and improper contrast contribute greatly to waste of time and materials. Lighting is sometimes inefficient not because there is not enough of it, but because there is too much, as is often the case with natural light.

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Direct and reflected glare and harsh contrast of light and shade are the greatest enemies of good vision. Direct glare is usually caused by unshaded light, by shades that do not fully cover the bulb and by lights that are too close to the line of vision. Reflected glare is caused by glossy or polished surfaces, white or too light working backgrounds and poor location of light source.

Eyes are injured when a person sits in a dark room and uses a spotlight for reading. Shops that are dimly lit and employ spot lighting for the work operation are poor places for work because the contrast of strong light and darkness causes eye fatigue which, if continued for a long period of time, injures the eyes of the employees.

Diffused light is the best kind of illumination. Diffusion of light can be accomplished by having the light go through an opal glass fixture or by directing the light rays toward the ceiling to obtain indirect illumination by reflection.

### ***Color Tuning the Plant***

To use appropriate colors in the plant is to give the worker improved visibility, greater safety and psychological incentives for activity, all of which result in increased production.

The following are major factors that should be kept in mind with regard to a production situation:

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1. Cheerful surroundings make cheerful workers. Drab colors make sluggish workers.
2. Warm places of work can be made to feel cooler by surroundings of cool colors.
3. Cool places of work can be made to feel warmer by surroundings of warm colors.
4. Deep colors on walls and furniture absorb much light, require more foot-candles of light and result in large electric bills.
5. Light colors reflect most of the light and aid in illuminating the interior, thus providing proper light at less cost.
6. Work backgrounds (walls, tables) that are too light or too dark cause eye fatigue and cut down production.
7. Glossy surfaces cause eye fatigue and hinder production.
8. Mat or dull surfaces and surfaces that have proper contrast to the material worked on aid production.
9. Warm, bright colors applied to dangerous parts of machines prevent many accidents.
10. Primary hues of specific identity can be used for marking machines, pipes, controls, etc., so as to increase efficiency.

The following factors must be considered in color-tuning a plant: type of employee, nature of work, character of materials manufactured, kind of equipment used, dimensions of the plant area, source of

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natural lighting, type of artificial lighting and room temperature.

### ***Color in Offices***

Let us see what it costs to have a drab office. Two employees face a drab gray wall. It's depressing, and consequently they do less work, or haphazard, inaccurate work. In another room two other employees face a white wall and the glare irritates their eyes. The results are complaints of headache and inefficient work.

What is gained by having an office color-tuned? The environment raises the spirits of the employees and inspires them to work efficiently and more consistently.

What about the executive himself? Is he above his environment? He is not. It is probable that he is even more sensitive to his environment than his employees are, because he is more sensitive to all other problems in his business. He, like his employees, sometimes comes to the office tired or irritable or disappointed and low in spirits. How much is it worth to him to have an office environment that will lift his spirits, give him clear vision and inspire him to get down to business with zest?

Business problems are often emotionally upsetting. How much is it worth to the executive to be in an environment that will counteract the emotional

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strain? Some of his associates annoy him, but he can't do anything about it. However, he can choose an environment that is not irritating but spirit-lifting.

We should remember here that colors derived from red or orange-red are stimulating, and colors derived from blue or green-blue are sedative. The personality of the executive, therefore, should be taken into consideration when planning colors for his private office. The appropriate color plan plus an orderly office provides a physically comfortable and psychologically beneficial working environment.

The following are a few cases illustrating the effectiveness of scientific color application in interiors.

The president of a radio station reported that complaints of headaches and "spots before my eyes" ceased after his studio and office were color-tuned. Employees were gay, and visitors remarked how beautiful and inviting the studio looked.

The president of a dress manufacturing company wrote: "We have just finished redecorating our main and upper floors with a separate color scheme for each executive office, in accordance with your color recommendations. It is with great gratification that I express the satisfaction of this organization with the finished results. Our main office appears larger and creates a pleasant impression not only upon visitors but upon those members of the organization who work in that office regularly. We find that our executive offices, while done in colors that are particularly pleasing to the occupants of the separate



## COLORS—WHAT THEY CAN DO FOR YOU

offices, provide a harmonious effect with the surrounding areas, which is in accordance with your plan. We believe that we will derive values from our present redecorating program that have not even been considered in the past."

The president of a large research bureau wrote: "Before leaving for the West Coast recently, I was much concerned over the chaotic condition of the second floor of our building and wondered how it could ever be put into some semblance of order. Upon my return I was amazed to find a most inviting group of offices. Such offices no doubt contribute much to employee relations and efficiency. It is our desire to tune in, with an appropriate combination of colors, the rest of the offices on each floor, including the file and library rooms."

An orderly environment inspires orderliness. Chaotic surroundings breed chaotic thinking and irrational behavior.

The design of the furniture pieces and their arrangement are as important as the right color combinations in creating a favorable environment.

Furniture that is simple in form, smooth in finish and clean in line is best for an office. Furniture that is ornate, carved or cluttered with superimposed patterns distracts the worker and interferes with efficiency.

A pleasing room arrangement is so proportioned that it has variety and harmony. In other words, the various objects should have a relationship to one an-

## COLOR IN INTERIORS

other so that they have a common character or look as if they belong to the same family although they are varied in shape and dimension.

An office that has modern, simple furniture proportionately arranged, with colors of the right hue and value, has an atmosphere conducive to clear thinking and efficiency.

### *Color in Restaurants*

A community leader took a guest to a restaurant in which he regularly dined. The proprietor was very proud of the color lighting he had just installed. Being in high spirits and wanting to help his old customer make a good impression on his guest, the proprietor asked the chef to prepare a specially fine, rich brown chicken. But when the chicken was served it was a sickly, unappetizing gray. Three times the chicken was returned to the kitchen and each time it came back it looked sickly gray. When the color lights were removed, food ceased changing color on the way from the kitchen to the dining room.

During the butter shortage when margarine was served in its natural cold white state, people refused to eat it. But when the margarine was colored to a warm soft yellow, people enjoyed eating it, and most of them did not realize it was margarine until they were told.

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We also know that colored liquor sells faster than white liquor even if the added color does not change the taste.

It should be remembered that surface colors are greatly affected by the type of illumination. Therefore when we consider color for a restaurant we must include the lighting as well as the surface colors.

Cold and warm light have distinct characteristics which can be used effectively for special purposes.

In restaurants and places of entertainment where the intention is to encourage people to linger, yellow or warm lighting is very effective because it flatters the complexion, creates a sense of coziness, produces the effect of warmth and induces the desire to relax.

Color lights that are specifically cold, such as blue or blue-green, are unkind to the human face, and people do not like to see their friends or loved ones in that kind of light.

Although daylight blue is not as hard on the complexion as a strong blue artificial light, it too is unflattering. Cold light is not romantic. It is sharp and glaring.

Of course, the type of restaurant should be considered. If it is to be a quick-service sandwich shop, cold daylight would be ideal for business. It will encourage people to eat quickly and get out.

Psychologically, the cold light inspires the idea (consciously or unconsciously) that you may as well be outside; it seems no different inside. This is particularly true in the summertime when fresh air is

## COLOR IN INTERIORS

an additional incentive. But fresh air is not very strong competition to soft, warm lights, pleasing surface colors and pleasant company.

We should remember that although color knowledge is acquired, color sensation is instinctive, and color harmony is in our eyes and has psychological effect. People do not have to study color harmony to be influenced by it.

Because of afterimage, the tablecloths or dishes should be complementary to the color of the food. A table that is complementary in color to the food saturates the eye with the color, causing an afterimage that enhances the appearance of the food. For example, a tablecloth of a specific green will make meats look browner and richer.

The afterimage is one important factor that has been overlooked by many users of color, and some serious consequences have resulted. Unfortunately, many difficulties caused by color are not solved because the trouble is not always traced to the source.

We have all kinds of evidence demonstrating that color plays a great part in the enjoyment of food. Food experts know that the appetite is conditioned by the sense of sight just as much as by the sense of smell.

The freshness of food is judged both by smell and by color, and the enjoyment of food is governed by the color on the dinner table as well as by the quality of the food and the ingeniousness of the cook.

An outstanding example of the importance of sur-

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face color in restaurants is the experience of a well-known chain of eating places. When the operator opened his restaurants, he had the idea of creating an atmosphere of cleanliness by having pure white walls of shining tile. Business, however, was not too good.

The restaurant operator then introduced color into some of his places. These did so much more business than the white-tiled establishments that he soon changed the interiors in all of them.

The color was not applied scientifically and therefore did not achieve maximum results. This case history, however, does show that white is a psychologically negative and uninviting color.

When we understand the distinctive characteristics of specific colors, we can no longer be indifferent to them. We know that the use of a deep blue where a delicate pink is needed can cause much harm.

We must always be aware of the fact that when we say "color" we do not mean hue alone but also tone, shade or tint, because the exact value of the hue is an important factor in psychological effect.

No one factor makes or breaks a restaurant, but a number of factors combined can make or break it. Some of the factors the restaurant man knows best. He appreciates the value of a good location and of fine cooking. Most restaurant operators realize that a pretty waitress is a help to business. But are they aware of the color of her uniform as an element to be considered?

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A psychologically beneficial color plan is a factor not only in satisfying customers but also in keeping employees contented. If not consciously, then unconsciously, the waitress or waiter will choose to work in a place that is pleasing and emotionally stabilizing.

The following examples illustrate color problems in a restaurant.

What color plate should be used for green salad? This question was asked a number of people. Some said any color, some said white, others said blue, and there were a few who said green. None realized there is a scientific approach to the subject.

The answer is that the plate should be of a color complementary to the green salad—a cool red. This red will make the salad look greener and fresher because complementary colors enhance each other. But “red” still does not describe the color fully. The red has to be diluted. Actually it should be a cool pink which expresses delicacy and subtlety.

On what color plate should bread be served? Here too there is the scientific answer. The color should, of course, be complementary to the color of the bread, which means that it should be a blue-green or green-blue value.

On what color plate should butter be served? The answer is not yellowish white china but a green-blue tint or a bluish white that will bring out the richness of the butter.

What color uniform should the waitresses wear? An ideal combination is a color the same as or simi-

## COLORS—WHAT THEY CAN DO FOR YOU

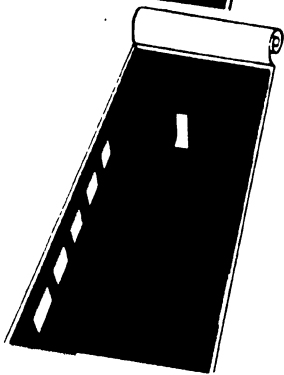
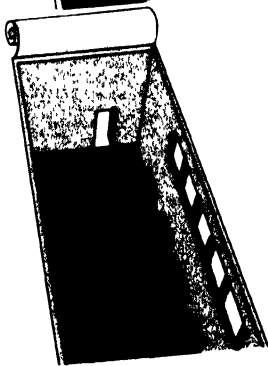
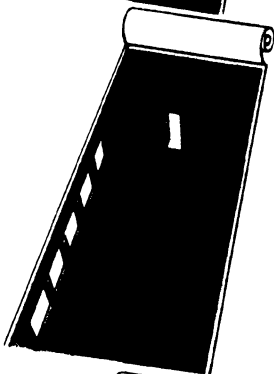
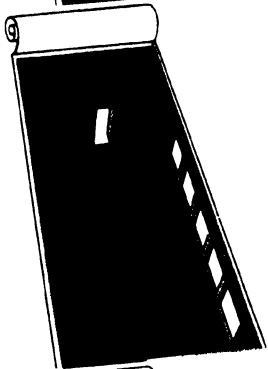
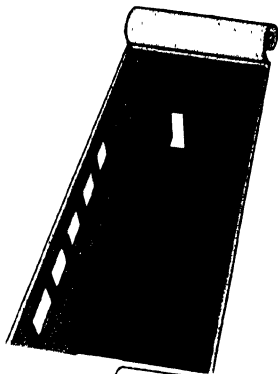
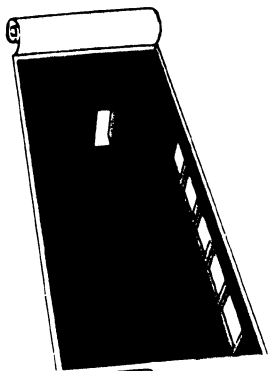
lar to that of the tablecloth, complementary to the walls. That is, if the walls are peach, the tablecloth and uniform should be of a green-blue tone. If the walls are blue, the tablecloth and uniform could be predominantly of a yellow tint or tone. It is generally advisable to have walls, uniform, tablecloth and dishes harmonized in analogous and complementary colors.

Is it profitable to give your place psychological appeal, a feeling of harmony, unity, distinction and specific identity? Extensive experience with package designing and color and design testing provides the answer. Package designs that have psychological appeal, harmony, unity, distinction and specific identity always go together with products that sell well. We know through investigation that this is not merely coincidence.

Scientifically planned designs spur impulse buying. They attract and hold attention and create a desire to buy. The housewife is, of course, generally not at all conscious of the fact that she is buying the package design. She rationalizes and convinces herself that it is the contents she needs.

Since color and design are such important factors in a small package, we can easily see what tremendous factors they are in a large place such as a restaurant.

The elements that constitute an effective color plan are not determined by a decorator's personal taste but by scientific analysis.



Office interior in six color plans, each with a specific visual





## COLOR IN INTERIORS

Each color, each shape, each pattern must have a function. It is the purpose of the interior that should determine the exact color values. This is the scientific approach.

Psychological appeal means that each color is inviting. Color harmony means that the colors are agreeable. Unity means that the place has a "one kind" look about it. Distinction means that it is out of the ordinary. Specific identity means that you just cannot forget the place.

In addition, there are the color factors that make the salad look fresher, the meat richer, the waitress more attractive.

Scientifically planned colors can create a friendly mood and a festive spirit where these are desirable. And the employees in the kitchen can be made to feel cooler with the right use of color.

Illumination is always an important feature of the color and design plan.

Walls of delicate tones in combination with dim, warm lighting make a room an ideal place for relaxation. Such an interior invites people to linger. A room in rich, vibrating colors that are combined with brilliant lighting is conducive to activity.

It is also well to keep in mind that color depends on form as well as on light. This means that badly designed furniture can ruin a perfectly conceived color plan.

Elaborate gingerbread carvings, like meaningless, intricate color patterns, create numerous optical and

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mental disturbances. They draw attention away from the food and the service. They clutter the mind and burden the emotions.

Many a customer does not return to a restaurant because he cannot tolerate the gaudy or heavy decorations. More often than not, he attributes his aversion to something entirely different—perhaps even to the food.

The class of customers is a determining factor in the kind of color and design and type of furniture that should be used in a restaurant. For some kinds of clientele, blond wood and a predominance of pastel tints are prescribed. For others, dark-finish furnishings and deep colors are advisable.

A restaurant catering to a “dignified” clientele should have a subdued, restrained color environment. A night club, on the other hand, is a place for entertainment and stimulation. The color and design should therefore be highly dramatic in character.

The kind of food also is a factor. A tea room calls for an entirely different color plan than a steak house. A seafood restaurant needs still another kind of interior planning.

Scientific studies have shown that the senses operate simultaneously. If someone were to give you two gum drops while you were blindfolded and your nostrils were closed, you would not be able to tell one flavor from the other. Both candies would taste sweet, but you would not know which was cherry and

## COLOR IN INTERIORS

which was lime until you could smell or see them. Most people do not realize that taste depends both on smell and on sight. What people generally call taste is actually a combination of taste, smell and sight.

We experience color sensation through the rods and cones of the retina in the eye, smell through the olfactory nerves in the nose, and taste by nerves in the tongue, but we identify flavor with the three senses.

Milk served in a colored glass is likely to taste bad. Experiments have been made by changing the color of a beverage with tasteless ingredients. People refused to drink orange juice that looked like tomato juice and rejected tomato juice that looked like orange juice.

We know that all of our senses—taste, smell, sight, touch and hearing—function co-ordinately, and that our nervous system, emotional stability and state of mind are affected through all five senses.

Obviously, the colors and forms in an eating situation are just as important as the taste and the odor. "People eat with their eyes," said one well-known restaurant man. A scientifically planned color scheme, appropriate furnishings and the right lighting are therefore vital factors in operating a restaurant successfully.

## COLORS—WHAT THEY CAN DO FOR YOU

### *Color in Public Institutions*

We have to have walls before we can put color on them. First we must be able or willing to provide the physical facilities. Then we can begin to plan a psychologically healthful environment.

As long as our social consciousness and sense of social responsibility are in the present state of development, our cities will have dismal residential areas and ugly public buildings.

The residents in the slum areas do not have the material means to improve the conditions responsible for so much physical, mental and emotional deterioration.

So long as our country's leaders are more concerned about balancing the national budget than promoting national health, we can expect little interest on their part in color for public institutions.

In planning colors for institutional buildings, the nature of the institution must be considered. Children's institutions should be given a treatment different from that of old people's homes or clubs. Recreation centers require color plans quite different from those prescribed for institutions of learning.

Public buildings are notoriously offensive. Not only is proper psychological color lacking, but often even decent lighting and ordinary cleanliness. Insofar as the color scheme is concerned, public employees of course have the same psychological needs as

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employees in private organizations; therefore here too, in the choice of colors, tones instead of tints should be used.

Each room in a public building or institution should be treated in relation to the character of the occupants, to the activities carried on in the room, to the room's dimensions and to its light source. The exact color values should be determined in the same way as for industrial plants and other private establishments.

Places where children live should be planned to meet their psychological needs, not to please the director's personal taste. Children's play centers should have vigor and brilliance. Walls, curtains and furniture should have predominantly warm colors. Bedrooms should have cool sedative colors. Children's dining rooms should be cheerful and provide an atmosphere conducive to eating. And as for the effect of the color of dishes on appetites, try serving spinach on magenta red plates.

### *Color in Schoolrooms*

Once upon a time, "school" meant physical and mental drudgery in poorly lighted and stuffy rooms. Modern schoolrooms, however, are intended to provide for our children favorable lighting conditions and a healthful environment in which to study.

Progressive educators are constantly planning im-

## COLORS—WHAT THEY CAN DO FOR YOU

provements in curriculum and teaching methods. Educational leaders now recognize that the physical surroundings are vital psychological factors in study situations.

They are very much aware of the fact that education for modern living requires the integration and correlation of many elements. Courses are planned in relation to each other, and mental and physical studies are co-ordinated for the purpose of developing the children into well-integrated adults. Progressive modern education is geared to the demands of modern living.

Adequate physical facilities are now provided by all progressive school systems. Environment and atmosphere conducive to study and learning are now considered essential. Comfortable desks and proper lighting are recognized as basic needs in all schoolrooms.

Educators have encouraged furniture designers to develop posture chairs. Modern schoolroom seats no longer are cluttered with functionless design and disturbing ornamentation.

Some educators are co-operating with lighting engineers in developing more efficient lighting for the schoolroom. But not much study has been given to color, and the fact that color and light are interdependent is being widely disregarded.

Appropriate colors are important factors in providing visibility as an aid to study, as well as in

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creating an environment that is conducive to study and promotes physical and mental health.

We should recognize that surfaces are just as important in efficient lighting as are the lighting fixtures and bulbs. Lighting consists of a light source and reflection. The light source may be sunlight, an incandescent light bulb or a fluorescent tube. The lighting may be either direct from the light source or indirect, in which case the light is focused toward the ceiling so that reflected light illuminates the room. Whatever the type of lighting, the colors on the ceiling and walls are important factors.

If the correct wall color is not used, the walls will be either too dark and absorb too much of the light, or too light and create blinding glare for students and teachers. For ceilings, white is highly recommended because students do not look at the ceiling, or at least shouldn't. For walls, white is most undesirable.

Still more important is the psychological aspect of color. Too many schoolrooms are depressing places. Many cases of nervousness, irritability, lack of interest in learning and absenteeism could be eliminated by merely providing proper color environment.

Where color has been used, the choice has too often been a subjective one—a notion of an official or a teacher instead of selection based on scientific color principles.

Mere use of color accomplishes little that is constructive. The right hue and exact value are as im-



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portant in a schoolroom as they are in an industrial plant.

Continuous reading or writing tires the eyes, and it is necessary at certain intervals to turn away from the paper or book. To shift the gaze from a white sheet to a blackboard is anything but restful. On the contrary, turning the gaze from white to black and back again means that the eyes have to make extreme readjustments which, if repeated often, are injurious to the eyes.

Shifting the gaze from a white paper to a white or near-white wall means more glare and no relief. Only a neutral tone of specific value provides the needed eye comfort.

It is commonly known that tired eyes are responsible for much neglect of school work. And glaring white walls or blackboards that are permanently exposed to view are great contributors to eye fatigue.

We should remember that the light reflection factor is determined by the value of the color (lightness or darkness). The psychological effect is produced by the hue (red, blue, yellow, etc.) as well as by the value of the color.

Rooms that are intended for concentrated study should be treated with cool colors, tones derived from blue or green-blue. Libraries, therefore, should have cool colors.

Rooms that are designed to stimulate activity of any kind should be treated with warm colors, tones

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derived from red or orange. Assembly halls and rooms in which discussions are conducted should have warm colors.

The choice of hue, however, depends partly on the type of lighting. It is not recommended, for example, to use blue in a room that has natural light only from the north. If the purpose of the room calls for a blue-base color and the room gets only cold light, yellow should be added to the blue. In other words, green should be the hue.

If, on the other hand, the purpose of the room calls for a stimulating red and the room gets an overabundance of direct sunlight, blue should be added to the red. A purple or violet tone should be the color for such a room.

Preparing the right color values for schoolrooms is not work for an average house painter. Such a project should be handled by a color engineer, one who understands the physical, chemical, physiological and psychological aspects of color.

### *Color in Hospitals*

In hospitals, as in industrial plants, the maintenance engineer generally is responsible for decorating and keeping the institution clean.

A few progressive hospitals today recognize the psychological powers of color and are introducing the use of color in therapy. In such hospitals, the

## COLORS—WHAT THEY CAN DO FOR YOU

rooms are not merely decorated, but are scientifically color treated.

The traditional hospital with its glaring white is cold and depressing. In the old days a hospital, if it was not white, was not regarded as sanitary. However, we have numerous ways of detecting germs nowadays. We no longer need to use the psychologically devastating white for chasing dirt and germs.

The modern hospital can and should be a cheerful place. Every means should be used to lift the spirits of patients, visitors and employees. The lobbies and halls should, therefore, be in delicate but warm colors, such as peach or pink. The reception rooms, however, should be in cool colors that will tend to calm nervous patients or worried visitors.

For operating (and delivery) rooms, a blue-green tone that is complementary to the color of blood should be used. This will eliminate the possibility of green afterimages on the wall when the surgeon raises his eyes from the incision.

The color in the patients' rooms should be appropriate for specific emotional needs.

In physiotherapy rooms or wards where patients are given massage treatments, soft, cool, restful colors should be used.

In orthopedic rooms where the patients are encouraged to use their limbs, warm colors should be used. Here it is also advisable to introduce decorative designs of stimulating character.

In pediatric rooms, designs in rich colors that ap-

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peal to children should be put on the walls. Children enjoy abstract as well as realistic art, and they have a great appreciation for brilliant colors.

In hospital rooms, ceilings should never be white because patients spend much time lying down, eyes toward the ceiling. White creates glare and is very depressing.

We should realize that the efficiency of the personnel as well as the well-being of the patients is affected by the color in the interior.

It is easy to recognize that red is warm and blue is cold and that orange is hot and yellow is sunny. But to dilute any of these colors to the appropriate tint is a problem for a professional person. To neutralize a hue, that is, to gray it down to a specific tone, requires even more experience.

At this stage of progress there still are not enough people who understand both the psychological aspects of color and the technical problems involved in mixing the needed color value. It is desirable whenever possible to secure the services of a color specialist, one who understands the psychological as well as the chemical nature of colors.

If the services of such a person are not available, it is best to have the colors chosen from color swatches by a competent psychologist or psychiatrist. Then an experienced color mixer or decorator can duplicate the colors.



VI

*Color in Merchandising*



## ***Eye Appeal in Packaging***

Magazine publishers create demand by using what they consider the most appealing covers, but often they do not treat the problems of design and color scientifically in relation to public reaction. Through experience and observation, however, they have arrived at certain standards of what presumably appeals to the average person or to the kind of people they intend to reach.

Outstanding artists and photographers are engaged to create the covers. Expensive plates are used to reproduce the designs, often in full-color printing. Cost is no obstacle where magazine covers are concerned because the publisher knows that the cover must arouse desire for the contents. It is true that the contents must have interest for the purchaser, but it is the cover that often stirs the impulse to buy.

Book publishers use book jackets to create desire for the text. Yes, the book must have quality; it must be well written; it must have an interesting subject; the name of a well-known author is an aid to selling. But the publisher knows, too, that the book must be in a jacket with eye appeal.

The opinion of the critics that the book is worth reading will arouse interest in the book, but the "action of buying" is spurred by the jacket. Many good



## COLORS—WHAT THEY CAN DO FOR YOU

books have been commercial failures because of poor jackets. Booksellers know that the jacket is not just a dust wrapper but an eye-opener and action-getter.

Manufacturers have learned in the last few years that packaging frequently is responsible for more sales than the product in the package. One cosmetics manufacturer put out a cold cream of good quality; yet it did not sell as well as a competitor's product of inferior quality. When a designer suggested that an attractive container and a well-designed carton would increase sales, the manufacturer skeptically agreed to spend money on repackaging the cold cream. Within a month sales doubled; within a year sales were up 800 per cent!

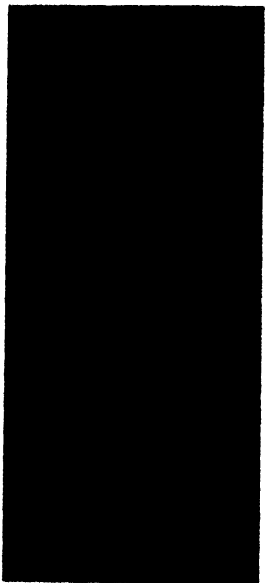
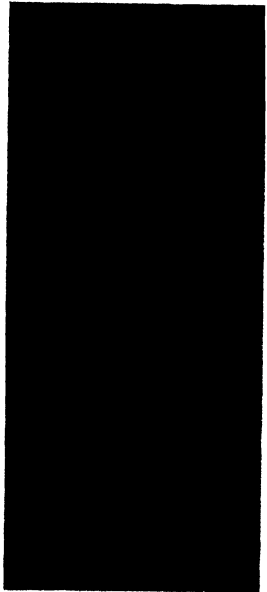
Manufacturers spare no expense in packaging their goods in the most attractive containers. The package often costs more than the contents. No expense is too great for packaging because it is designed to create desire for what is inside.

### *The Package as Symbol*

Originally, the package was intended to serve merely as a container to protect the product from damage, from atmospheric conditions, transport hazards, loss of flavor and evaporation. A package also determined a specific measure or weight—a pound, quart or bushel.

In modern merchandising, the package is planned





*Four envelopes with hues of specific identity and greatest retention power.*

## COLOR IN MERCHANDISING

to convey the character of the contents and is designed to be used for effective display. Where the product is displayed through a transparent window in the package, design is used to provide an effective setting. Package design also includes the name of the product, the trade mark and explanatory copy.

Color alone can be used to symbolize the product. For some products, however, it is best to use a realistic illustration. In the case of partly prepared or raw foods, it is often advisable to present the product as it appears when ready to be served. For example, people are interested, not in a package of flour, but in the pancakes that can be made from the flour; hence they find most appealing an illustration of freshly made, buttery pancakes. Although a realistically drawn image without color, particularly if it has human interest, can have great appeal, it will not attract as much attention as one in color. Actually, there is no realism without color because there is no pure black and white in nature.

Appropriate colors, harmoniously composed, will bring maximum results. A fitting design with appropriate colors can be created only after studying a number of factors. An artist's highly developed taste usually is unlike the taste of the buying public. In packaging and display, design is not an abstract form of aesthetic expression but a means for merchandising a product.

Because colors are remembered much more easily than forms, they should be used for building product

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identity. A design with a multitude of colors has no specific identity, while one with one or two colors is recalled with ease.

The field of the design, the background, should be a clear specific color. It is easy to remember and describe a yellow box, a blue can or a pink container. For some products a realistic image can also be used for building identity. Colors, however, offer many more possibilities.

Designs for food packages should, whenever possible, have a color symbolizing that food. For example, brown of a specific hue characterizes coffee. For fruit packages, a realistic color photo or painting of the fruit can also be made part of the design.

A vital point to watch is that the color does not symbolize something distasteful or dangerous. A certain red may symbolize poison rather than cherries, and some greens may suggest very unappetizing associations.

Tints have entirely different symbolism than do shades or pure colors. Tints always suggest delicacy, whereas deep shades symbolize strength and pure hues denote richness.

It is safe to use a rich red in packaging a toy that is intended for children. But for a product intended for young babies, the red should be diluted to a subtle tint that will appeal to the mother.

People are not often conscious of the effect of symbolism, nor are they generally aware of the direct psychological effect that color has on them.

## COLOR IN MERCHANDISING

However, when basic psychological color appeal and symbolic effect are combined in a package design with strong visibility and good legibility, the design begins to play its intended role—to attract notice, to hold attention and to get favorable action from the public.

Immediate recognition or easy identification of the package is of the utmost importance. It should be realized that package identity is product identity; that's why simplicity in design should be always maintained.

### *Color for the Package*

We should remember that color names are unreliable because they are generalizations. All people do not give the same names to some colors. Therefore, only colors with specific identity should be used.

When complementaries of pure hue are placed next to each other, a vibration is set up that may interfere with comfortable visibility and readability. Pure complementaries are psychologically overwhelming even in small doses. Therefore it is advisable to use a pure hue with a shade or a tint of complementary hue.

In package design the hues should be both contrasting in value (deep shades against light tints or the reverse) and complementary in hue whenever

## **COLORS—WHAT THEY CAN DO FOR YOU**

possible. Unless a specific factor dictates otherwise, very grayed colors should not be used in packaging because they have poor visibility and are difficult to identify.

The psychological and symbolic powers of color, and also visibility and legibility, are important factors in design for packaging. The colors should have maximum psychological appeal, be symbolic of the contents of the package and have highest visibility. Copy should be easily readable.

Because of the many factors involved, some degree of the major color elements often has to be sacrificed. For example, if a competitor's design already contains the color that is strongest from the psychological point of view, the second strongest color must be chosen.

Often maximum visibility must give way to psychological appeal. For example, in packaging cosmetics, colors with high visibility are psychologically negative.

The type of consumer is an important factor. Designs and colors that have strongest appeal for women will not have maximum attraction for men. Packages for products intended for children cannot be treated in the same way as those intended for adults.

In packaging, as in advertising, the economic status of the consumer must be considered. Design and colors intended to appeal to an exclusive consumer

## COLOR IN MERCHANDISING

group must be distinctly different from design and colors intended for the larger middle class.

Although delicate tints appeal to those with cultivated aesthetic taste, they have little effect on the majority of people. Pure hues of the primary and secondary colors jar the sensibilities of those with highly developed aesthetic taste, but they have strong appeal for the majority.

A manufacturer who has a number of products would do well to have a characteristic color and design in all his packages. These help build identity of the company and each package strengthens the others.

In a package for a product of high quality, the interior of the container should be in a hue that is complementary to the color of the contents. This will enhance the color of the product because complementary colors have an intensifying effect on each other—blue making yellow appear more brilliant, blue-green making brown look richer, etc.

### *Designing the Package*

The surface design must always be in keeping with the three-dimensional design. The size, dimensions and shape of the package are major factors in laying out the surface design.

After a sufficiently durable and appropriate packaging material has been selected, the following factors



## COLORS—WHAT THEY CAN DO FOR YOU

should be considered in planning the three-dimensional design: (1) size—pound or quart, (2) dimensions—height and width, (3) shape—cylindrical or rectangular, (4) ease of handling, (5) the space it will occupy in the store and in the consumer's home, (6) the way in which the package is to be opened.

Both the form of the package and the surface design can be made to give the illusion of greater volume. Certain shapes give the impression of being larger than they are.

Lines in the design that lead the eye out from the package make the package appear larger than it is, but lines that lead the eye inward cause the package to appear smaller.

Lines that run up and down make the package appear taller than it is. Lines running across the package make it look shorter and wider. An outward curve appears larger than an inward curve.

A light-color figure against a dark-color background appears larger than a dark-color figure of the same size against a light field.

Because packages are displayed in stacks, the design must be effective in the over-all pattern which results when the packages are stacked. Many a design is suitable for the individual package but is a failure when the packages are stacked.

Traditionally, package designs are cluttered with elaborate patterns, numerous colors and excessive copy. In recent years we have learned that detailed ornamentation, too many colors and excessive copy

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produce a negative effect. Simplicity is the keynote of modern packaging design.

In redesigning the package of a well-known product, recognizable features of the old design should be incorporated into the new one, so as to retain identity. The new design invites fresh interest while features of the old are recognizable to habitual buyers of the product.

The following questions should be asked before a final decision is made in the choice of a package design:

1. Does the design have distinct identity among a number of competitive packages, in pattern, in color and in the character of the brand name?
2. Does the design symbolize and enhance the character of the contents?
3. Does the design suggest the greatest volume and highest quality?
4. Will the design and color appeal to the class or group of people who are to use the product; that is, are the design and colors psychologically correct?
5. Are the colors harmonious?
6. Does the design have a sense of unity (oneness)?
7. Does the design have the best visibility in competition with packages of other companies?
8. Is the descriptive copy legible?

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9. Is the surface design in keeping with the shape and size of the package?
10. Does the design look equally effective by itself and when the packages are stacked?

It is now well established that colors affect all people by direct sensation and by symbolism through unconscious or conscious association. And we know that in packaging as well as in all forms of advertising, the visibility and legibility factors of color are very important.

Often, however, it is not possible to make maximum use of all the four aspects of color power, and we are forced to balance these color factors for each specific problem. At times the best color, from a psychological point of view, has to be sacrificed for the sake of identity, and at other times symbolism has to be at least partially sacrificed for purposes of visibility.

Use of color power in packaging means taking advantage of the effect colors have on the prospective buyer. And we are now aware that the effective color for one group of people may not at all be the potent color for another group.

Fitness of color to product is another factor always to be considered. The right color for jewelry is not the appropriate color for a food product. The right color for toys is not the color to be used for hardware tools.

Nor is the right hue enough; the exact value, shade and tint are equally important. For some types

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of packaging, these are even more important than the hue. One kind of red may succeed where another shade or tint of red will fail.

The right color combination is still another strong factor in packaging design because color combinations that are not harmonious are offensive. Also, colors should be combined to achieve both maximum visibility and maximum legibility.

The scientific approach should be used in selecting color and design intended as merchandising aids. The scientific approach means avoiding reliance on individual judgment and eliminating personal taste. Numerous manufacturers have failed because they depended on their personal judgment in evaluating what the public wants. Many have had great losses because they believed that their standards were identical with those of their prospective customers.

Recently six packages were made up, identical in three-dimensional and surface design, but each with a different shade of red. With these, a test was conducted among purchasers for whom the package was designed. Result: One shade of red was selected by 76 per cent of the persons tested.

Twelve package designs were presented to the executives of an advertising agency. The majority of the executives chose No. 11 as the best. The packages were then presented to a jury of artists and art directors. The majority of them declared No. 7 the best. The manufacturer insisted on No. 12. No agreement was possible. It was therefore decided to conduct a

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test among the prospective buyers of the product. Result: 86 per cent of them chose design No. 4.

One of the errors many manufacturers still make is in believing that people spend money for things they should have whereas actually they spend it for things they want. After they have been given what they want, it is possible to give them what they should have. But this can be done only by creating a want for it.

One of the purposes of an advertising campaign is to educate the public in accepting and using a new product. The package design, however, is not intended for that purpose.

The package design should appeal to the unconscious. It should be designed to attract and to please. In other words, it should satisfy the wants of the people.

The only colors that should be used in packaging are those that are favorites with the people who are to buy the package. And the only reliable color is the one that has been scientifically selected. Only the color that has been tested and analyzed from a consumer aspect is a safe bet.

It should always be kept in mind that the right color is the most important single element in a package design because of its effect on the emotions.

About 90 per cent of our actions are prompted by emotion and only 10 per cent by reason. The color element of a package design is the most im-

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portant because color is a matter not of reason but of emotion.

We should keep in mind, when applying color to packaging, that some colors are sedative in character while others are stimulating. The emotional reactions to colors (particularly in small doses) are usually unconscious but nevertheless very real.

And in addition to the inherent powers of colors there are the symbolic associations of colors. These are potent because they are part of our tradition. They are ingrained into our daily mode of living and are part of our means of communication.

Such expressions as "red hot," "poison green," "sickly yellow," "pure white" are woven into the social fabric and are part of man's psychological make-up. They are therefore major factors in our daily life. The package designer can cause great loss for his client if he disregards these potent powers of symbolism.

For purposes of visibility, red no doubt is a proper color for a cold-soft-drink container. Symbolically and psychologically it is the worst possible color. It is true that a well-known soft drink has been a great success in spite of the wrong color symbolism. But that does not mean that the drink could not have been an even greater success, and with less cost, if a cool color had been used on the container instead of a hot red.

It is probable that for that particular product at the given time, visibility was more important than

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any other color factor. This is an excellent example of the necessity for weighing and choosing the best color element for the purpose.

There is no advantage, however, and plenty of disadvantage in a blue "Hot Food" sign. Blue has poor visibility and, being a cold color, it contradicts the word "hot" in the unconscious, if not in the conscious, mind.

In designing food packages, consideration for color symbolism is very important. The freshness of food is judged by both odor and color. Enjoyment of food depends on the sense of sight just as much as on the senses of smell and of taste.

You would not think of trying to sell green bread or gray coffee. Neither should packages for these products be in those colors. The unconscious mind would in many cases associate the color with the product and sales would be lost, although few people would be conscious of their reason for rejecting the product.

Using a color that symbolizes the product in the package, on the other hand, will spur the desire to make a purchase. If the color symbolizing the product has poor visibility, a second color of good visibility power can be added. A two-color design can thus have both symbolic and visibility effectiveness.

We should be aware of the fact that it is not the design in fine taste that is always effective. Packaging design is not in the realm of the fine arts, and art specialists are therefore not the best judges.

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At an exhibition of advertising art, prizes were awarded to four outstanding pieces. Three of the prizes were awarded by a jury of art specialists and the fourth prize by a public vote. The three pieces chosen by the art specialists received very few popular votes, while the fourth, which received an overwhelming vote from the public, was not even considered by the professional jury of awards.

Although the piece of art work that won public approval lacked aesthetic and technical quality, it nevertheless was the most appropriate piece for advertising or packing purposes.

The racial and cultural backgrounds of people are important factors in color and design preference. It pays to remember that the economic status and the age of prospective buyers are other important elements to consider in planning a package design.

Regionalism should also be given attention. Colors that are popular in New England may not appeal to the people of the West.

Successful packages for domestic consumers are not necessarily appropriate for export business. Packages for the Asiatic market should be entirely different in design and color from those planned for the European market.

An oil company that exported its product to India for use in oil lamps was informed that the natives loved red and had reverence for monkeys. The company therefore had a red monkey painted on the oil containers that were to be distributed in India.



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Needless to say, business was fine. Yet the cost of putting the red monkey on the cans was no more than the cost of using the regular trade mark on the cans for domestic distribution.

A canning company distributed a food product in the Balkans for a number of years, but with little success. A packaging designer suggested a new package with colors that are popular among the Balkan peoples. When the new package (with much red) was introduced, business boomed.

A European candy manufacturer, exporting to this country, changed the colors on the candy box on the recommendation of an American color analyst. Soon sales in this country more than doubled.

A manufacturer exporting to Latin America changed the blue color on his package to a certain red. Business increased greatly.

We have much evidence that the package design is the greatest contributor to impulse buying. A homemaker goes to the grocery store with the intention of buying milk, butter, eggs, bread. Usually she comes home with a few additional, very attractively packaged items—cheese, crackers, cookies, cereals, canned meat, canned fish and so on.

She often spends more for the articles she did not intend to get than for those she planned to buy. The reason is impulse buying, caused mainly by the attractive package design and by a well-arranged display of the packages where they could be easily

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reached. Packaging design and attractive, easily accessible displays are inseparable.

A number of surveys on impulse buying have been conducted at chain, department and grocery stores. As the shoppers were ready to leave they were asked what items they had planned to buy, what additional items they had bought and what caused them to make the additional purchases.

An average of three out of five said that they bought many articles because they were attracted to them, liked and wanted them.

In a five-and-dime store, over 90 per cent of the shoppers admitted buying items on impulse. Most of them said that they were attracted by the package displays.

A grocery store study revealed that the buyers had not intended to get 18 per cent of the purchased items until they caught sight of the articles on the shelves.

In another grocery, a number of food packages that did not sell well from the shelves were placed in display baskets on the floor. They became the best sellers. Then the grocer placed in the baskets all packaged articles that moved infrequently from the shelves. The attractively packaged articles continued to sell fast. The items in poorly designed packages remained in the baskets for a long time.

A soap manufacturer found that a very fine soap did not sell well. A new package was designed, and the soap soon moved into the best-seller class.

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A dehydrated food product, packaged in an envelope of intricate design in five colors, sold very poorly. Sales multiplied when the same product was introduced to the public in a two-color envelope of simple design.

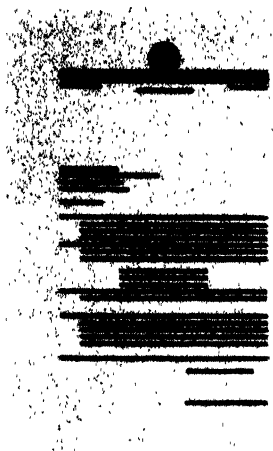
A shaving cream manufactured by a well-established company did not sell well. The cream was given a new name and the colors and design on the tube were changed. Sales increased rapidly.

An envelope-packaged article on sale in drugstores moved very slowly. When the same article appeared on the counter in an envelope with a modern design and appropriate colors, sales multiplied.

One survey showed the following sales resulting from impulse buying:

	<i>Department Stores</i>	<i>Grocery Stores</i>
Proportion of shoppers who bought on impulse	60%	75%
Part of each dollar of total sales spent on im- pulse	42¢	26¢

Recently, a scientific procedure was developed to determine packaging (and advertising) effectiveness before the package is manufactured. New packaging designs and advertising art are now tested and analyzed before they are printed. Tests are used to determine:



A complete mailing.



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1. Psychological effect (preference and retention) of the basic design image or layout.
2. Psychological effect (preference and retention) of color or colors.
3. Color symbolism.
4. Visibility of the design.
5. Legibility of the copy.
6. How the eyes travel through the design or layout.

An analysis is made on the basis of all the factors.

This scientific approach to all design and advertising art makes unnecessary the expensive procedure of having numerous designs or layouts made, and does away with the hazards that come from choosing a design and color on mere personal opinions. It avoids the high cost of testing package (or advertising) effectiveness after it has been put before the public.

### *Arranging the Window Display*

Window displays are among the major means for stimulating the promotion and sale of products. And the use of right colors is very important in the window display field.

To bring about the greatest number of sales, the window display must attract attention, arouse interest and create a desire to examine the merchandise. These results can best be obtained by having ap-

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appropriate colors and effective arrangement. Color and arrangement combined become a most potent psychological alliance in making sales.

Movement is always a contributing factor to the success of a window display. Movement is achieved by a live model, by the mechanical movement of an inanimate model or by suggested movement through the use of leading lines and angles.

Other factors in achieving successful window displays are the type of merchandise, the physical construction and the background. Also to be considered is originality in arrangement and in lighting.

There are various mechanical and electrical devices for making objects move and for changing colored lights.

Lighting is an important factor in the arrangement and in the color effect. Proper lighting provides possibilities for interesting shadows to help tie individual pieces of merchandise into one unit. Because lighting affects color, the proper lights must be used for getting the best effects. The wrong light can ruin the appearance of the merchandise.

The arrangement or composition plays a major role in its power to hold the spectator's attention. A well-arranged window display leads the eye in an easy and orderly way through the entire exhibit. Poor arrangement demands extra eye effort and creates resistance.

Organizing a window display requires the use of

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the same principles as composing a work of art or an advertising layout.

However, although the window display should be arranged as a three-dimensional picture, its primary purpose is to sell merchandise, not to produce a pleasing pictorial effect.

If there is any design in the background, to be effective it must lead the eye to the merchandise, not away from it. A point of great interest in the exact center of the window will cut the window in two and thus break the unity of the display.

The background should help unify the display. All elements of the background should be so coordinated as to guide the gaze from one article to the other throughout the entire window. Under no circumstances should background design be permitted to steal attention from the merchandise.

Because warm colors advance and cool colors recede, overly warm colors should be avoided on backgrounds. For example, if a blue-green piece of merchandise is to be exhibited, the blue-green color would, of course, be enhanced by its complementary color—red or pink (red diluted with white). But red or pink, being warm and vibrant, will come forward and thus distract attention from the blue-green merchandise.

In such a situation, it is advisable to use a delicate tint, of the same hue as the merchandise, for the background—for blue-green merchandise, a delicate blue-green tint, mostly consisting of white, with just



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enough blue-green to provide color flavor and affinity with the merchandise.

However, in such a case, the display needs to be warmed in some way. This can be done by placing some object in a color of the red family (the complement) near the blue-green article. It could be a show card, a ribbon or another piece of merchandise. A mere touch of red or pink will enrich an entire setting of blue-green.

With bright red colored merchandise, the background should, whenever possible, be blue-green. The blue-green should be diluted to a tint to provide contrast in value as well as color complement for the red merchandise.

With merchandise of a delicate, warm tint such as pink, a cool hue for the background may be diluted with white or can be deepened with black (or by mixing with the complementary hue). The deep background will provide contrast in value as well as color complement for the pink material.

The type of merchandise plays a part in determining whether the hue for the background should be diluted to a tint or deepened to a shade. For feminine articles, tints are advisable; for men's wear, shades. Tints for delicate objects and shades for rugged objects is a good rule to follow.

Delicate and cool tints in the background will make a window look deeper and larger, while warm deep colors will make it appear crowded and smaller. Despite this, however, a deep-color background

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should be used if that will provide the mood desired for the particular article. But it is not advisable to have the background more brilliant than the merchandise on display.

In windows where articles of many colors, both warm and cold, are to be displayed, the background color should be cool and neutral. Remember that color is neutralized by mixing it with white and black (gray) and cooled by adding some blue.

It is possible to display delicately tinted merchandise together with articles deep in color. One way of accomplishing this is by making part of the background deep and the rest delicate in tone. The dark articles are then placed against the light-toned background and the display pieces of light tint against the deep color.

In such a window display, care must be taken not to split the arrangement in half and thus break up the unity of the display as a whole. We should always keep in mind that the composition of the display should guide the eye through it in its entirety.

Lighting can be an aid in arranging a window of varied articles. Shadows caused by a beam of light can be used to unify the arrangement and to guide the eye.

It is advisable, if possible, to display in a window merchandise of but one classification. Infants' wear would hardly be appropriate with sporting goods. Dress shirts, however, should be shown with ties.

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The ties provide accented spots of color and at the same time are closely related to the shirts.

Remember that although, from the viewpoint of physics, white is all colors combined and black is not a color, visually white and black (light and shade) are specific color values and are basic elements in our ability to see three-dimensional forms.

However, black is psychologically negative. It is a depressing color and should be used sparingly. But black plays an important role by negation; that is, it makes adjacent colors vibrant and more beautiful. That is why a black gown is flattering to a woman with a naturally rosy complexion or with well-applied cosmetics.

Black should not be used for window backgrounds for three important reasons: (1) it is basically depressing; (2) it has no attraction power; (3) it absorbs tremendous amounts of light.

However, a black background is excellent for showing up brilliantly colored objects, provided that very little of the black is seen.

Black-colored articles should always be displayed against a background of delicate cool color. Tints of blue-green, green-blue or violet-blue can be used. The specific tint should be chosen on the basis of symbolic value, appropriateness to the type of merchandise and the season of the year.

White should not be used for display backgrounds because (1) it is bleak, (2) it promotes glare, (3) it has little attraction power—not much more than

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black, (4) it is lacking in favorable psychological character.

White articles, like black ones, should be displayed against a cool background which can be deep in value or light, depending on the character of the items. A display of white goods can be greatly embellished by casting a delicate blue light directly on the white merchandise.

Gray, the perfect neutral, has no effect whatsoever on adjacent colors. It is an ideal background for showing the true values of all spectrum colors, but since it does not enhance any object it is not recommended for display backgrounds.

Pictorial backgrounds can be very effective in window displays—for example, a body of water and sailboats for bathing suit displays, or a snow scene for displaying furs. Pictorialism can be dramatic and should be used whenever possible. A symbolic, pictorial background can be a means of unifying the display.

For a bathing suit display, waves painted in a forward-rushing movement attract attention. And boats should be distributed to carry the eye from one article to another. They should not be concentrated at one end of the window. Under no circumstances should a static-looking boat be placed in the center of the display.

For winter outdoor wear, a snow scene can be so composed as to guide the eye. A fence partly covered with snow is very effective in unifying an arrange-

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ment and in leading the eye through the display. A tree branch carried though the entire background setting and shadows on the snow are excellent for giving unity to an arrangement.

The success of a window display depends primarily on the arrangement or composition and on the relationship between the color of the merchandise and that of the background.

In planning displays it pays to know that painted backgrounds are an excellent means of attaining unity and guiding the eye, and that the arrangement and color should be correlated to achieve unity and smooth eye movement. An effective background color is one that provides contrast for the merchandise without detracting from it. Lighting (color and white light) should be used both as an aid in composing the display and in modifying color values in the background.

### *Color Lights in Display*

Color lights can be used effectively for providing color environment for any display in the store. Color glass bulbs or white bulbs in reflectors with color glass lenses or filters can be used for this purpose. If the color light is too strong, it can be mixed with white light, and in that way a great variety of tints can be created.

Because every object or form in a store or window

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display draws some degree of attention, it is advisable whenever possible to conceal the source of lighting. Lamps or reflectors should be placed completely out of view so that full attention can be given to the merchandise.

Another point to remember is that the light should be directed toward the merchandise and not in the direction of the observer.

Color lights are most effective in *getting* attention when they are strong and pure. However, subtle tints are much more successful in *holding* attention. Because warm colors in strong doses are overstimulating, people do not like to remain too long in their presence. Delicate tints are therefore recommended for most displays.

You need only an orange-red light, a green and a violet-blue. With these you can mix all the other colors. Orange-red and green lights will make yellow light. Green and violet-blue result in green-blue light. Orange-red and violet-blue lights will produce a magenta red light. By adding white light, the magenta red is turned into rose or pink.

You may also find an amber light useful. Amber is warm. It is desirable in many display situations for use either by itself or for warming other colors.

Amber light and white light of equal strength combined produce a pleasing yellow tint. One amber light used with two red lights of equal strength produces an orange tint. An amber light and a green light result in a soft, warmer yellow-green.

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Any of the colors can be reduced to delicate tints by merely adding white light.

Color light will often obliterate the colors in objects. A light red package displayed against a gray background cannot be illuminated with a red light because this would render the gray background just as red as the color in the design. However, if the red in the design is of a very deep value, it will still keep its identity because of the contrast in value with the background.

In solving the practical problems of display lighting, we must be aware that color light changes the surface color of anything it strikes. Color light should not be used on merchandise if the true color of the material to be sold is intended to be shown. Therefore, spotlights should be used for throwing color light on the background or on the setting only. Because floodlights would cover everything in the display with color, they should not be used on merchandise in which color is a factor.

It is not advisable to use color lights for displaying such merchandise as clothes or yard goods. For merchandise in which light is not a factor—hardware, glassware, musical instruments,—color light can be used very effectively to attract attention and create a pleasant mood.

By using spotlights, color can be focused on only the background or setting to provide an appropriate atmosphere. A warm color light can be used to suggest heat in relation to heating equipment. A yellow

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can be thrown on the setting to create the feeling of sunshine, or a cool green can be used to present sport activities. Blue light on the background suggests coolness and can be used in settings for fur coats.

Color shadows can be produced by throwing color lights on the object from two directions. One light causes the shadow, the other light colors it.

For white light, the so-called daylight lamps are best because under these lights materials look very much the same as they do in natural light.

When merchandise is presented to a customer under yellow light, he may be pleased with it, but when he sees his purchase in the daylight he is often disappointed and returns the article. Artificial daylight inside the store, as well as in display windows, greatly reduces the return of merchandise.

It is advisable to use artificial daylight illumination at all times because the light can thus be constant and uniform, while natural light cannot be controlled. The changing character of natural daylight causes merchandise to appear different every hour and to vary on cloudy or sunny days. With artificial daylight, the merchandise looks the same all the time.

If only because windows take up valuable wall space in a store and need constant care, it is advisable to install artificial daylight. When all factors are considered, artificial lighting is not only more efficient but also less costly.



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When a woman shopper wishes to inspect a dress in natural daylight, she consumes her own time and energy and that of the salesperson each time she walks to the doorway or window. In this way a negative psychological effect is created and often a sale is lost. Artificial daylight, evenly distributed, assures more satisfied customers.

Direct lighting, emitted downward from shaded ceiling lights, is very common. Such lighting is efficient if it is not within the line of vision. Where the lights are hung low, however, their glare is very disturbing.

In indirect lighting, the light is thrown upward and reflected by the ceiling and walls. This is by far the most satisfactory type of lighting. White or a very light-colored ceiling and light-tinted walls are best for indirect lighting because the lighter the surface, the more light it reflects.

### ***Counter and Floor Displays***

When five-and-ten stores and other chain stores took goods off the shelves and placed them on the counters, sales increased tenfold. The beauty of the package designs made possible the placing of the articles on counters for close inspection by prospective buyers.

Counter and floor displays have made an important contribution to merchandising success. The dis-

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play of well-designed packages is in itself a silent but very effective sales force.

A package with appropriate design, short and factual copy, a catchy slogan and psychologically potent colors is a much more effective sales medium than the best sales talk.

The prospective buyer is not conscious of the power an effective display has over him. When a salesman presents an article he often creates defensive resistance in the prospective buyer. But when the prospective buyer surveys a display, he believes that he is master of the situation, that he can make a purchase or not, and he becomes the victim of the silent but psychologically aggressive display.

If, after the package is opened, the purchaser finds that the product itself is of good quality, repeat sales result.

Specially designed package containers and cards are effective aids in displaying packages. A display piece should have the following characteristics: (1) it should be original in design; (2) it should have appropriate and harmonious colors; (3) it should dramatize, by picture, copy and color, the quality of the product; (4) it should illustrate uses of the product; (5) it should urge trial of the product.

A well-designed counter or floor display cabinet, basket or card will accomplish the following: (1) attract attention, (2) hold interest, (3) create desire to inspect the product, (4) inspire confidence in the product, (5) bring about the wish to purchase it.

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### *Display Posters*

Every display unit, whether for counter or floor, should be tied in with advertising in other media. The same colors and design should, whenever possible, be maintained throughout the magazine advertisements and in the direct mail pieces. Identity is thus effectively established.

Counter and floor display units can be of cardboard, wood, plastics or metal. A variety of materials is available and many structural designs are possible. A counter display piece can be a die-cut card, with an illustration of the package as part of the design. It is often a card with the actual package attached to it. Many counter displays are in the form of racks in which a number of packages are placed. And there are also display baskets and display boxes.

Floor displays are similarly varied. There are floor stands in which the packages are piled for easy access. Life-size floor displays are very effective in attracting attention. Wall cards or posters are successful inside-store displays. Banners are often hung on wires to announce the sale of special articles.

No matter what the material or type of design, colors must be used appropriately for maximum effectiveness.

The color problems in all display designs are generally similar. However, the visibility of counter dis-

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play units does not have to be as great as that of wall cards or banners.

Displays that are placed high or on a wall more than six feet away from the customers should have colors of strong visibility and should be simple in layout and bold in treatment. Floor and counter displays, on the other hand, can be treated with detailed figures and smaller spots of color. Also, the copy on wall and ceiling display signs should be much shorter than on counter and floor display units.

A common but ineffective practice is to enlarge a magazine illustration for use as a poster. True, in order to build identity it is advisable to carry through the design and color in all media of advertising. The fact that a composition or layout is effective in a small scale, however, does not mean that it will fulfill the needs of a large poster.

While an illustration is intended to be studied, a poster must be designed to get the message across at a glance. Details that are meaningful in a magazine illustration are worse than useless in a poster because only simple forms and high-key colors can be grasped at a glance from a distance.

Only one idea should be expressed in a poster or billboard. The copy should be short and snappy. The fewer words the better. This holds true for indoor as well as outdoor posters.

The lettering should be simple to provide maximum legibility. The spacing between letters should always be greater than the width of the letter stroke.

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Ornate lettering should be avoided in posters unless the character of the product demands a specific style of lettering. Even then there should be a compromise, with the letters simplified as much as possible while still retaining the characteristic style. The larger the letters, the better. However, letter size should always be proportional to the rest of the matter on the poster.

We should always consider the fact that red objects appear nearer than blue ones. Red letters on a poster will stand out in front of blue ones if they are both of the same size and style.

Of the pure hues in surface colors, yellow has the greatest visibility, orange is second, red third and green fourth. In light, the most visible colors are red first, green second, orange third and yellow fourth.

Also important is the fact that we remember simple forms and basic images only, unless the subject has very unusual human interest. Therefore, posters should be composed and painted in large masses.

Complementary colors should be used on posters if the character of the product does not prohibit their use. Because complementary colors intensify each other, they provide the greatest visibility. Blue and yellow, red and green are always effective—if a competitor is not already using them. For outdoor posters, deep blue or a blue-black should be used with yellow.

The major element of the poster, whether it is

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image or copy, should be in a pure hue. If that is not possible, a very deep shade should be used, never a tint. If the product must be presented in a tint, the lettering should be either in a deep shade or in a very rich color.

Although letters of pure hue in long copy would cause eyestrain and headache in reading, they are most effective for short copy which is to be read at a glance.

Contrast is of the greatest importance in posters. Maximum color contrast can be achieved both by using complementary colors and by adding a sufficient amount of black to the color, if the color next to it is diluted with white. When you do this, you are using complementary hue contrast and black-and-white contrast simultaneously.

Yellow images against a blue-black background are just as effective as blue-black against yellow. Red images against a green background are just as good as green against red.

On inside posters, pure blue is better than blue-black because it is more vibrant. Pure blue does not have as good visibility outdoors because the color tends to melt into the horizon and is modified by changing atmospheric conditions.

Posters, like all advertising media, often attempt to appeal to reason. Basically, however, advertising is designed to appeal to the emotions. Colors, subject, art work and copy must all be co-ordinated to create maximum emotional appeal.

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In posters, more than in any other advertising medium, the emotional appeal must be made concisely and instantly. The poster is designed to catch men, women and children "on the go," whether on foot, in an automobile or in a public conveyance. Its role is to catch the eye and impress the mind with an idea, a form, a color, or all three.

Good composition is an important factor in poster design. Composition that permits easy eye movement is as essential in posters as in all other graphic presentations.

The successful poster consists of simply drawn forms in broad masses and a concise, direct word message in simple, solid lettering in colors of great visibility and psychological potency.

A repetition of the fleeting impressions made by well-designed posters is a most powerful influence.

Show cards are used extensively in window displays, but often insufficient thought is given to the problems of their composition and color.

Actually, the show card can be a potent psychological tool in merchandising if it is effectively composed in appropriate colors. Both visibility and legibility are important elements in show cards. Contrasting values of complementary colors should be used in all cases.

The background color of the show card should be complementary to the color of the merchandise. When reading such a show card, the eye becomes saturated with the color causing an afterimage that

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enhances the articles on display. For example, if the article is green and the adjacent show card is red, a green afterimage will result from looking at the red show card which will enhance the green article.

Additional interest can, of course, be created with graceful lettering and design. Basically, composing a show card is similar to composing a poster, though the show card should generally have even greater simplicity. While it should not be permitted to compete with the merchandise, the show card should nevertheless be the pivot of the display.

### *Color in Publications Advertising*

Advertisers know that the use of color increases results. Such words as "distinctive," "attractive," "natural," are often used to describe color advertisements.

Although it has long been known that the proper use of color in advertising brings greater profits, color users have had no way of knowing, except through trial and error, which color or combination of colors would be most effective for a particular ad.

In selecting color, advertising executives often "feel their way." Art directors use their best judgment and are guided by their own experiences. Fundamentally, the personal taste of the art director or advertising executive prevails.

Very often an advertising executive changes a



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color (and layout) merely to "get something new." Since he has no factual information as to public preference, the change has to be based on personal judgment.

But a new color scheme will not necessarily appeal to the general public more than the old one. Nor is the advertising executive's favorite color necessarily the favorite color of the people the advertisement is to reach. The fact that he is tired of the same old color does not mean that the public is. Therefore, although it may be advisable to strike a new note with a new ad, a new color scheme can often result in failure.

Color preference is an aspect of the individual's character. It is usually ingrained in the person's unconscious mind.

Color acts on emotion, not on reason. And you can change a person's ideas but not his emotional responses. People are not emotionally "set" about gadgets, machines or merchandise in general, but they are emotionally conditioned to color.

The cultural and educational background of the consumer must always be taken into consideration because culture and education have a great influence on color preference. Economic status is another vital factor in color appeal.

Since color effectiveness differs with various social groups, an advertisement selling a 10-cent article would require colors radically different from one selling a \$100 article.

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The right color performs the following functions in advertising:

1. It has specific psychological effect. It produces a definite emotional sensation. It is stimulating or soothing, warm or cool, powerful or delicate.
2. It has symbolic meaning. Some colors symbolize delicacy, others denote strength. There are colors for expressing dignity and colors that stand for quality. Some colors emphasize danger and some indicate safety.
3. It attracts attention. It catches the eye more quickly than black and white.
4. It has identity and retention power. Colors are remembered more easily than words or forms. When a certain color is constantly associated with a certain product (particularly is this true of primary colors), recognition is easily built up.
5. It has aesthetic appeal; it expresses beautiful form much more effectively than black and white.
6. It is realistic. Nature is not black and white. A black-and-white photograph is a symbol of a subject. The full-color picture is the subject as it really is. Color, more than anything else, produces the effect of realism.

For greatest effectiveness, the maximum powers of colors should be used, and these can be ascertained through an analysis of the specific color or colors.

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The following three factors, among others, should be determined in the analysis of a color in relation to a specific problem: (1) the psychological effect of the specific color on the social group it will reach, (2) the symbolic relationship of the color to the product, and (3) the attention and retention power of the specific hue, shade or tint.

### *Layout*

Although most advertisers consider copy the most important factor in getting a message across, they are also aware that the layout is their main means of catching the reader's eye and holding his interest. The objective always is to create a layout that will arrest attention, invite reading and guide the eye through the entire message with ease.

Some advertisers emphasize simplicity of design and short copy; others use traditional schemes. Some use much white space; others crowd the ad with illustrations and copy. Some use human interest; others introduce dynamic action through the medium of lines, forms and colors. Some use photographs; others, paintings.

Layout men are always striving to create more attractive and attention-arresting layouts. They are constantly looking for a new note, striving to be original, distinctive and in good taste. And all these ends, frequently, are groped at subjectively—that is,

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on the basis of individual judgment and personal experience.

In most instances, the effectiveness of a layout is evaluated by an art director or advertising executive. It is judged to be in "good taste" or "bad taste." It is described as modern or conservative, delicate or strong, startling or commonplace, appropriate or inappropriate for the specific purpose.

It is, of course, obvious that a design is either ugly, mediocre or beautiful. But even the most beautiful design can be sterile. Many a beautiful design has failed to have mass appeal.

If the advertising material is intended to appeal to the average consumer, the layout should not be designed purely in accordance with the personal taste of an art director or in line with the judgment of an advertising executive. The well-trained specialist has standards that are far above the taste of the masses. Therefore, popular reactions to an advertising layout can be determined only through the scientific process of testing and analysis.

An instrument known as the Brandt eye camera is now used for measuring the effectiveness of illustrated material. The camera photographs the actual eye movements of the person looking at a layout. This special camera has taken layout and pictorial effectiveness out of the realm of speculation and personal taste. Since the effectiveness of graphic material depends on eye movement, we can, with the aid of this camera, evaluate the power of every layout.

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In testing layouts with the eye camera, we find two kinds of attraction, subject interest and aesthetic interest. The aesthetic interest is in the abstract character of the layout itself, that is, in the organization of its lines, forms and colors, independent of the subject (if any).

Interest is often greatest in a layout that is abstract, symbolic, suggestive or in one that completely lacks association with any subject. So-called modern layouts or designs have aesthetic but not subject interest.

We of Western civilization are conditioned to move our eyes from left to right, because that is how we use them in reading. The Semitic peoples, however, read from right to left, and the Mongol races from top to bottom. Graphic composition then, to be most effective in advertising, should always be in keeping with people's eye habits.

A layout or design that contradicts the habitual movement of the eye demands extra effort and therefore does not possess maximum effectiveness in getting and holding attention.

For best results in advertising, layouts and designs for publications intended for Americans or Europeans should be composed with lines and forms that move from left to right. For publications to be distributed in Palestine, layouts and designs with right to left movement would be most effective.

Layouts that guide the eye up and down have been found to be universally effective to a consider-

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able degree. But they are most successful in China and Japan. For Westerners, such layouts are not as effective as those that lead the eye from left to right, but they are superior to those that lead from right to left.

The eye-movement quality of a layout, is, of course, not all that is important. In evaluating the character of the layout, as well as its color, the following conditions must also be established: (1) *what* the nature of the product is, (2) *whom* it is intended to serve, (3) *when* it will be presented, (4) *where* it will appear.

The layout should always express the character of the product. The social and economic status of those whom the advertisement is to reach must at all times be considered. The time of year and the general economic and social conditions should not be overlooked. The kind of publication in which the advertisement is to appear is also an important element.

Using the analytical, scientific method of appraisal will insure a psychologically potent layout and an advertisement that will produce maximum results.

Composition is the art and science of organization. To lay out means to compose, to organize. To lay out an idea of a product presentation means to arrange the images (articles) and lines of type into a given space in an orderly and unified manner.

Every layout must have: (1) variety—two or more points of interest, (2) harmony—pleasing relationship between adjacent forms and colors, (3) move-

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ment—from one point of interest to the other, (4) unity of all elements in the entire layout. These are basic. In every layout, each of these essentials must be present to some degree.

A layout also has certain subordinate elements, forms and colors—a certain degree of parallelism, balance, repetition, contrast, abruptness, transition, alternation, gradation and continuity.

The four basic elements—variety, harmony, movement, unity—plus some of the subordinate elements, determine the effectiveness of a layout.

Layouts can be put into three classifications—dramatic, lyrical and static.

A dramatic layout has a maximum of contrast and abruptness. A lyrical layout has a maximum of alternation and gradation. A static layout has a maximum of parallelism and balance.

Extremely active, fluctuating, contrasting forms produce a dramatic effect. The forms and lines in a dramatic layout, no matter what the subject, leap and drop abruptly, then rise again. One form rushes at the other. The hues are complementary, the values are contrasting. Sharp lights are set against deep shadows. The opposition, however, is organized and harmonized. The entire movement of the layout is co-ordinated into a single dynamic unit.

In creating a dramatic layout the greatest skill is needed to achieve the necessary harmonious and unified effect. The artist must be on guard against the danger of the major forms and colors entirely elimi-

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nating the smaller and less important spots of color and copy.

However, in dramatic layouts as in all other types of pictorial compositions, the main forms and colors, the captions and lines of key copy must dominate the layout.

Dramatic types of layout are usually most successful in presenting industrial subjects.

A lyrical layout is vibrant and delicate. It ripples but never roars. It moves but never leaps. Its forms and lines have variety but never too much of it. The colors are usually not complementary and contrasting, but analogous, that is, related by a common color denominator. The lights and shadows merge softly.

Alternation of forms, soft tonality and delicacy of color gradation are predominant in a lyrical layout.

Lyrical layouts—sweet, graceful and easy-moving—are best suited to women's products.

A static layout is usually symmetrical. It has many parallel lines and produces a tranquil effect. It does not attract attention as a dramatic or even a lyrical layout does, but it does invite close study. With a static layout color should be used for gaining attention.

Static layouts are best suited for catalogs, statistical presentations and for some types of packaging designs.

Artists often discuss composition and color as abstract entities. For advertising, however, the com-



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position and the color must have a definite objective and must be in keeping with the message and product. Also, both layout and color must be appropriate for use in a specific advertising medium and must have appeal to a specific audience.

Color and layout can express masculinity or femininity, ruggedness or delicacy. You don't use the same colors for advertising hardware that you do for perfume. The layout and color that express the strength of steel wouldn't do for a baby powder advertisement.

Color and layout that fit a national magazine will not be effective in a trade journal. For national magazines, advertisements are planned to appeal to the entire family. They should therefore have the flavor of the home in color and in composition, whereas the advertisement for a trade publication is designed to appeal only to people in the trade.

For merchandising booklets presenting quality articles for men, layout and color should be dynamically dramatized. The composition should have much movement. Figures, forms and lines should express ruggedness.

Art work for booklets intended to promote a high-grade product for women should be in a delicate color key and lyrical in compositional presentation.

For general consumer goods or mail order catalogs, it is best to have relatively static layouts with the colors primarily realistic. Art work for the mail

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order type of catalog, as for statistical charts, should be detailed, formal, static and crisp.

Simplicity is the keynote for newspaper ads. Such layouts should not be overly delicate, nor too abstract, because the newspaper medium does not inspire careful observation or close study.

Art work for a newspaper advertisement should have movement of a smooth, lyrical nature. It should not be static like a photograph or realistic drawing in a mail order catalog. In a newspaper art work is intended to attract instant attention, whereas in the catalog it is used primarily for identity and characterization.

### *Color Power in the Printed Message*

Although language is the medium of daily communication, it is not at all adequate for transmitting a message effectively. We know that language conveys only a small part of an idea. That is why in advertising we call on graphic art and color to become the allies of language.

The printed word itself can be enriched with color. Color inks, properly used, contribute much strength to the printed message. Copy that is printed in the right color is attractive, alive, interesting and easy to look at. A message printed in the appropriate color has maximum readability, plus color stimulation.

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The time a person spends in reading a message depends on the interest the message possesses. Using color with appropriate type faces means adding interest to the copy. Color is a factor not only in getting attention but in holding interest as well. It is therefore not advisable to depend on words alone when conveying an important message.

Using color indiscriminately, however, often does more harm than merely using black ink. To get the full value of color, it must be used appropriately, which means scientifically. The basic principles involved in color usage are simple.

Contrast is a basic requisite for legibility or readability. The contrast ordinarily achieved with black ink on white paper can be attained with color in two ways. One is to add black ink to the color ink, thereby deepening the color value; another is to use complementary colors.

Printed copy in black ink is actually not black but gray-black in tone value. In using color ink, the color takes the place of the gray.

On white paper, any of the colors that have good legibility can be used in pure hue if the situation demands it. That is, they are suitable if the pure colors are in some way in keeping with the subject, if the message is short and if the type face is large. In the order of effectiveness, the "legibility hues" are blue, purple, red, green. Orange and yellow inks have no legibility value.

For booklets, whenever possible, it is advisable for

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advertisers to take advantage of colored paper. For lengthy copy, the color of the paper should be of a delicate tint, and a sufficient amount of black should be added to the ink to attain maximum legibility. The quantity of black depends on the amount of color in the paper. The deeper the color of the paper, the darker should be the ink.

For lengthy copy, it is usually advisable to use a color of ink that is related to the color of the paper. For green-tinted paper, green ink; for blue-tinted paper, blue ink; for red-tinted paper, red ink. The color ink should at all times be deepened with black.

In lengthy copy, color power is most effective when subtly used. Delicately tinted paper and color inks of deep values (mixed with black) provide color stimulus of which the reader may be unaware. The colors produce pleasant sensations, although the average reader is not likely to exclaim, "Look at this color printing!"

For short copy, or where sustained reading is not called for, an ink of a color complementary to the color of the paper is most effective. For green-tinted paper, red ink; for red-tinted or pink paper, green ink. Again, if the type face is small, the color value should be deepened considerably with black.

Where it is desirable to bring out key lines of copy, complementary colors should be used. Such color combination causes the printed lines to stand out because a color is intensified when placed next to its complement.

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A safe rule to follow is to use a color of ink related to the paper color for the body of the copy, and the complementary color of ink for the highlights.

Using two colors of ink on colored paper to convey a message in type means strengthening the message with additional emotional appeal.

In cases where paper of brilliant color is best, as for some booklet covers, a color of ink complementary to the color of the paper should always be used. Contrast is then achieved not by value (black and white content) but by color complement, which means that just as black looks blackest next to white, so green appears greenest next to red, and blue looks bluest next to yellow.

Factors, in addition to ink and paper contrasts, contributing to legibility or readability are: (1) style of the type face, (2) type size, (3) type boldness, (4) leading, (5) length of line.

The various type faces have distinct characteristics. Some suggest informality, others austerity. Some are delicate in character, others strong. There are ornate type faces, and some of Spartan simplicity.

Type faces vary greatly in their degree of legibility. A type face should be chosen both for affinity to the character of the message and for maximum legibility.

Type faces that are most effective in black ink on white paper are not necessarily the best for color inks. Some type faces that have poor legibility in black ink are excellent for color ink.

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The simpler the type face, the more suitable it is for color ink. Although Futura and Spartan type faces may be too austere for most purposes in black ink, with color ink they are very effective.

With simple, clean-cut type faces the color takes the place of serifs, providing flavor and character. Although characteristic serifs give distinction to type faces in black ink, in color ink they often become blurred and weak, thus greatly hindering readability.

The size of type faces is a second important factor in legibility. Sizes of type are indicated in points, 72 points to the inch. Six-point type is  $1/12$  inch in depth, eight-point type is  $1/9$  inch in depth, twelve-point type is  $1/6$  inch and twenty-four-point type is  $1/3$  inch.

Where the copy is lengthy, ten-point and twelve-point type, in most faces, are generally best for readability. Because maximum color-flavor is always desirable in advertising, for color inks the larger the type the better. If space permits, eleven- or twelve-point type should be used for lengthy copy.

Boldness of type faces is a third factor in legibility or readability. It is very important when color ink is used.

Extra-bold type does not have good legibility in black ink. The wide area of black absorbs light and hinders readability. If the width of the type faces is greater than the white space between the letters, the letters tend to merge.



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With color ink, however, bold type takes on another character. While light type does not give the color maximum advantage, bold type provides a sufficiently wide area for the color to become a positive factor. The greater weight of the type face becomes an asset when the appropriate color of ink is used.

The bolder the type, the less depth of color value is needed—that is, the less black content in the color ink. Bold type is particularly advantageous for short copy.

Leading is the fourth factor in legibility. It is a device for making large masses of type easier to read. Leading means adding to the background space or white space between the lines of type. This is done by inserting strips of metal between the lines of type. Two-point leading is a minimum for favorable legibility; for advertising literature three-point leading is more desirable.

A fifth factor for maximum ease in reading is length of line. Experiments have demonstrated that, in most type faces, ten-point type has greatest readability when set in lines from  $2\frac{1}{2}$  to 3 inches (15 to 18 picas) long; twelve-point type, when set in lines from  $3\frac{1}{2}$  to 4 inches (21 to 24 picas) long; fourteen-point type, 4 to 5 inches (24 to 30 picas) long; and eighteen-point type, 5 to 6 inches (30 to 36 picas) long.

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### *Case Histories of Color Power in Advertising*

Color cannot compensate for a poorly chosen type face or bad printing. However, when properly used, color tremendously fortifies the printed message through its attraction, interest-holding and emotional power.

The following reports illustrate the effectiveness of color in advertising:

Sears, Roebuck and Company, Montgomery Ward and the National Cloak and Suit Company reported that color outpulled black-and-white about six to one.

A mail-order company reproduced an article of wearing apparel in natural colors for half the catalog run and in black-and-white for the other half. Its color page pulled fifteen times better than the black-and-white page.

A stove manufacturing company found that its color advertising cost 70 per cent more than black-and-white, but that returns were 395 per cent greater.

A national advertiser, offering to give away a picture, reported that full-color reproductions drew four times as many inquiries as black-and-white.

A cosmetics manufacturer reported that after advertising in full color, his business increased over 600 per cent.

A department store that regularly ran black-and-

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white ads on low-priced dresses in the daily papers decided to try an ad in full color. Nearly 500 per cent increase in business was the result.

A clothing manufacturer reported that a black-and-white advertisement in the *Saturday Evening Post* brought only 338 inquiries whereas a four-color advertisement in the same magazine brought 1,334 inquiries.

In 1907, about 5 per cent of the advertising pages in the *Saturday Evening Post* were in color. Now nearly 70 per cent carry color.

### *Psychological Aspects of the Envelope*

The original purpose of the envelope was to serve as a container. This physical function has not been eliminated, but an additional function, a psychological one, has been added.

This psychological factor is as important as the physical one, because the envelope provides the first sight and touch contacts and through them creates favorable or unfavorable initial impressions.

Each object we see produces a sensation, if not a full conception, of the object. This means that every envelope we see has a favorable or unfavorable effect of which we may or may not be conscious.

The psychological aspect of all containers and covers consists of two factors: color and design. The specific psychological power of color is determined

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by its hue (red, blue, green, yellow) and by its value (varying from very light to very dark). The specific psychological effect of the design depends on the form or shape.

Envelopes are still considered by many users as mere containers. The psychological value of the envelope is as yet not widely known. But realization that design and color can be channelized for specific purposes and for maximum results is increasing.

Until recent years, the effectiveness of a design was usually judged subjectively; that is, it was evaluated by an executive on the basis of personal taste. A design was in good taste or in bad taste. It was created by a well-known artist or by an unknown. It was conservative or modern, "sweet" or "strong," startling or commonplace. It was expensively or cheaply printed, depending on the kind of audience it was intended to reach. Nowadays we evaluate designs scientifically and analytically.

Color also has been subjected to scientific analysis. The use of color is no longer a guessing game of "what I like" or "what you like." Color for direct mail selling is now treated as a scientific problem. The psychological power of each color has been put to scientific testing so that we now use color not from personal choice but for what it will do.

In preparing advertising material for direct mail selling we must take into account that each color exerts a characteristic psychological power over people. We must recognize that there are delicate

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colors and strong colors, feminine colors and masculine colors, heavy colors and light colors, colors that are receding and colors that are advancing, colors that are hot or cold, stimulating or sedative, and colors that are depressing. By harnessing color power and then directing that power, we can make it serve us constructively. The psychologically powerful design is invariably a functional one. It is always appropriate. It always fits a purpose.

Design power, color power and an effective message are a stimulating action team. Color, design, message are the unbeatable triumvirate in advertising. They are the advertiser's most powerful combination for gaining attention, arousing interest, kindling desire and promoting action.

In direct mail practice we have a standardized system of addressing the envelope or card in the space at right center, with the return address at the upper left and postage at the upper right. It is natural for the recipient to look first at the address in order to check whether the message is intended for him. Since the natural movement of the eyes is from left to right, the next point of focus after the name and address is the postage stamp.

The jump from address to stamp is further facilitated by the color of the stamp. Because of this, the sender's return address is often passed unnoticed, yet every commercial mailer knows that his trademark, trade name or firm name is an especially important part of his mailing.

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An effectively conceived envelope will first draw attention to itself among a number of other envelopes; second, it will draw the eye to the trademark or firm name or to the message highlight; and third, to the receiver's address. From there on the impulse will be to open the envelope.

In this way the stamp will be inconspicuous and remain what it actually is—merely a postage mark.

Such an envelope is dynamic. It commands attention. It creates interest. It inspires desire. And it promotes favorable action.

A psychologically conceived envelope, in short, is a complete unit of co-ordinated color and design which guides the eye from left to right and utilizes the natural, easiest way for the eye to travel.

Effective design of the envelope not only will eliminate the drawing power of the color in the postage stamp but can, at the same time, be used for getting across part of the message in the enclosure. The results from a mailing can be greatly increased by highlighting the enclosure message on the envelope.

Some mailers use first-class postage in order to give their sales-promotional mailing what they think is extra prestige. With a scientifically designed envelope, however, this is not essential, for the denomination of the stamp is rarely noticed. The envelope's design and color render the stamp unimportant.

Fine design and the right color express character and quality and do not need the help of first-class



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postage. With scientifically chosen color and psychologically conceived design, even third-class mail possesses first-class effectiveness.

Many mailers have been surprised to learn that color-and-design-powered mailings actually cost less than ordinary, commonplace mailings! The saving that results from using third-class postage instead of first-class more than covers the additional cost of envelopes powered with color and design.

Even with first-class mail, the increased returns due to color and design more than make up for the additional initial cost. Mailings treated with art work and color have often brought more than three times as many replies as those minus design and color printing.

However, just any kind of design and mere use of color will not assure favorable results. Only color and design that have passed an objective or scientific test will be effective.

The envelope, like the magazine cover, book jacket or merchandise container, makes the first eye contact and should stimulate interest.

Numerous pieces of mail are received by most people. Envelopes look very much alike; their variations in size are not great. A mailing piece can, however, be fortified with color. Color can imbue an envelope with personality and distinction. There is no better way to make the unsolicited letter or uninvited message welcome than by use of color.

Because it is an emotionalizer, color is a powerful

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instrument for getting response. Using color for its emotional power means using it psychologically, and this is done by scientific and analytical processes, not by personal or subjective choice.

An envelope with too delicate a color does not have enough power to draw much attention among several pieces of mail. An envelope of rich hue stands out instantly. However, because the address must have maximum legibility, paper of pure hues cannot be used.

But envelope legibility does not require sustained attention, and for that reason the color of the envelope can be of a hue much richer than that of the enclosure stock, where sustained attention is essential in reading.

The color of an envelope is the attention-getter, the primary stimulant. It should therefore be as strong as possible, provided the intensity of the hue does not interfere with legibility.

Yellow paper of most brilliant hue can be used for envelopes. Red and green must be diluted to some degree. Blue has to be greatly diluted.

Envelopes of specific tints of yellow, blue, red and green are best. These colors have been found, through scientific analysis, to be most effective because of their distinctive identity and ease of retention.

Violet-blue and green-blue (likewise orange-red and magenta red) have distinct characteristics that are very evident when next to each other, but the

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colors often become confused in identity when they are separate. After a few weeks, most people find it difficult to remember whether the color was green-blue or violet-blue; only blue is recalled. In cases of orange-red and magenta red, only the red is remembered. Therefore, only one red and one blue should be used in direct mail.

Color inks always add stimulating power to papers. Every type of colored paper takes on a distinct personality and mood with every new ink applied to it. A great number of stimulating effects can be achieved by combining specific color inks with colored papers.

Not only can colored papers and inks be used to produce the desired psychological effect, but they can also be used to symbolize the product and to express such characteristics as masculine strength or feminine delicacy.

The "miracle of pink" is a scientific phenomenon and not an accident! Pink reply forms and reply envelopes generally bring more returns than any other color. Numerous tests have shown the pulling power of pink, and analysis tells why.

Pink is of the red family, and red is itself warm, attractive, inviting. It inspires action. But pure red, under most conditions, is too active, too stimulating. It shrieks; it forces itself on one; it often antagonizes. Pink, on the other hand, is red diluted, cooled down and neutralized. It is modest and dignified, yet it draws attention. It appeals, it stimulates, it produces

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a favorable mood and thus leads to favorable action.

Color can be so "tuned" as to create enthusiasm and invite co-operation and ready acceptance. It can be mixed to a value that entices or incites. Color can frighten, and color can be a thief; in fact, it often is just that. It can rob the message of its importance by drawing too much attention to itself. It can blind and confuse, and it often does this when we least expect it.

The mere use of color, therefore, is often worse than having no color at all. Remember that using color effectively means subjecting the hue, tint or shade to analysis and using a specific color for a specific purpose.

Since mail pieces are delivered in quantity, there is the problem of getting attention for your message. A distinctive mail piece always receives more attention than an ordinary one. Quality of paper and unique size or dimension of an envelope often get favorable notice. The right color, however, is the biggest factor in winning attention.

An envelope with scientifically selected color will win attention when a white or off-white piece may be overlooked among a multitude of other mailing pieces. And we should always remember that color that is scientifically selected will arouse interest and create a friendly mood, whereas color used haphazardly may scream visually and offend.

Many of us believe that we are creatures of reason and are convinced that we are objective and analyti-

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cal. But psychologists have shown that about nine out of ten of our actions are emotionally motivated. Colors are emotional factors and bring forth emotional responses. Indeed, color is now being used very successfully by advertisers for "building the desired mood."

A number of tests have been made with mailings. Half of a certain mailing, for example, was sent out in white envelopes, and the other half was sent to the same mailing list in envelopes of a scientifically chosen color. The mailing with color got as much as 400 per cent more returns than the white one. Since an identical message was used in both cases, the color of the envelope being the only difference, obviously this huge increase in returns was largely due to the color. Other tests have brought similar results.

### ***Psychological Aspects of the Enclosure***

An attractive cover, timely articles, interesting stories and effective illustrations sell a magazine; it is not the advertisements that sell it. But every advertisement profits from the magazine's literary and artistic contents, drawing prestige from such neighbors.

The mailed advertising piece, on the other hand, enjoys no such associations. It must stand on its own. It is a unit by itself and must compete with a great number of other units of similar nature.

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The person or company using direct mail can fortify his message against competition. He can give his mail piece great visibility, a friendly personality and distinctive character. He can do this with color. His unsolicited letter or uninvited message can be made welcome by having the right color on the envelope, in the paper and in the ink.

The enclosure, like the envelope, should be psychologically treated. Whether the enclosure is a letter, a bulletin, a leaflet or a booklet, it should be organized in keeping with the principles of composition and should incorporate the eye-attraction and eye-movement factors of color and design.

"Emotionalize" your mailing and you have a powerful instrument. Emotionalizing simply means using color and design scientifically. It means appealing to the aesthetic sense and reaching the emotions.

In recent years science and art have been combined in many fields. In advertising practice, science tells us how art can best reach the emotions.

A graphic unit has a tempo like music. A drawing or design can be lyrical or dramatic. Lines and forms can be chaotic and meaningless, or they can be made to have one focal point and several points of major and minor interest.

Every graphic layout, whether abstract or pictorial, causes a distinct eye movement; that is, every composition or design leads the eye through its area in a characteristic way.

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Lines and forms can lead the eye smoothly forward or to a given point, or guide the gaze away from that point. In other words, the way in which the eye is guided by the composition determines the psychological character and effectiveness of the piece of art work.

Contrary to popular opinion, the subject of a layout or design is not as important as the composition of its lines, forms and colors. We are conditioned to seeing all sorts of forms, as well as to hearing multitudinous noises. Forms that are organized compositionally are the exception and are called art. Organized sounds we call music. It is the organization or composition of forms or sounds that stimulates emotion, not the forms or sounds themselves.

Sometimes it is best to use only emotional forms, that is, abstract lines, forms and colors without realistic meaning. A realistic piece of art work in some cases will rob a message of its intended effect. A realistically drawn subject can be a thief, as can an inappropriate color. Either can take away interest from the message by drawing too much attention to itself.

For many objectives, however, it may be advisable to use a realistic piece of art work as an additional stimulant.

For enclosures, as for envelopes, red, green, blue and yellow should be used. However, for this purpose, the colors should be delicate in tint, much softer than the colors used for envelopes.

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When placed next to the same hue of full saturation, the delicate tint is hardly identifiable; next to its complementary hue, however, the tint takes on a distinctive rich quality; that is, a delicate pink that looks nearly white by itself takes on a distinctly pink character when placed next to green.

Although this paper tint is so delicate that often it is not immediately identifiable when isolated, it nevertheless has a strong psychological power. Its effect is more often on the unconscious mind than on the conscious.

A delicate tint of red, for instance, is not as likely to cause people to remark, "Look at this color." It will, however, produce a definite sensation and, when combined with a complementary color, takes on glow and stimulating character.

One reason delicately tinted papers are recommended for letters and other enclosures is that tints promote maximum legibility. The psychological power of the color should be used as an aid for getting the message across. Obviously, a color that would interfere with legibility would defeat this objective.

Another reason for choosing delicate tints is that they are never overemphatic. Where a color is too emphatic and attracts too much attention, it can rob the message by diverting interest from the typed or printed contents.

We should understand that the four colors—yellow, blue, red and green—are recommended for



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letters and other enclosure paper because they are physiological and psychological primaries. Each of these hues has a specific identity and a direct and characteristic psychological effect.

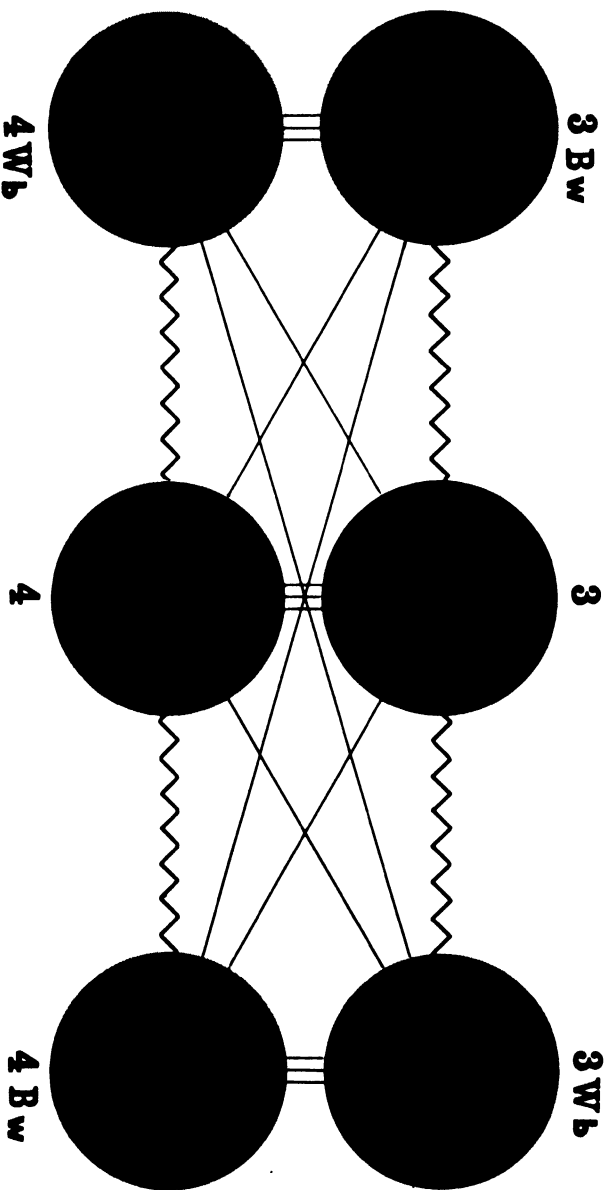
Secondary colors (mixtures of two primary colors in pigment, but actual primaries in light) have a tendency to overlap when they are converted to delicate tints by mixing with white or into deep shades by mixing with black. A tint of orange-red strongly resembles a tint of magenta red; a tint of violet-blue often gives the impression of a tint of green-blue. The shades have even closer resemblance.

At times, it is advisable to get the desired psychological effect with color inks only. The greatest variety of color inks can be used on gray paper, just as it can on white, because a true gray is the perfect neutral and has no effect on adjacent colors.

The psychological power of color plays an important part in follow-up mailings. When a follow-up mailing is of the same color as the preceding one, recipients frequently get the impression that they have already received that particular message and are apt to pay no further attention to it. When the second, third, fourth and fifth messages arrive in a different color combination, each produces a new and distinct stimulus and registers a fresh impression. Each color produces a characteristic emotional response, and there is no chance for anyone to say, "I've already had one of these."

We should remember that complementary colors





Complementaries, green and magenta red, of pure hue and in two tones, one light and one deep.

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intensify each other and produce the strongest sensation when used together. It is advisable, therefore, to use envelopes and enclosures of complementary colors. If the outside envelope is yellow, a blue enclosure is best. If the envelope is pink (of the red family), a green enclosure is most effective. These color combinations should always be used if other factors do not require otherwise. Such other factors are usually determined by the character of the message.

In follow-up mailings, the complementary color should be used for the immediate follow-up if possible. If the first mailing is in a pink envelope with green enclosure, the second one should be in a green envelope with pink enclosure, the third in a yellow envelope with blue enclosure, and the fourth in a blue envelope with yellow enclosure. Such follow-up mailing pyramids identify in addition to building effect.

Suppose a mailer has four enclosures—a letter, an illustrated circular, an order form and a reply envelope. In such a case the outside envelope, letter and circular should be of the same color or related colors, and the order form and reply envelope in the complementary color. If the outside envelope, letter and circular are green, the reply envelope and order blank should be pink. If the outside envelope, letter and enclosure are blue, the reply envelope and order blank should be yellow. Thus the reply envelope and order blank are quickly identified.

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The reply enclosures should be of the warm and vibrant color whenever possible. For the first mailing, it is advisable to have a green outside envelope, letter and circular, with a pink reply envelope and order blank. The second mailing should have a pink outside envelope, letter and circular, with a green reply envelope and order blank. The third mailing should have a blue outside envelope, letter and circular, with a yellow reply envelope and order blank. The fourth mailing then must have a yellow outside envelope, letter and circular, with a blue reply envelope and order blank.

Follow-ups on magazine advertising sent out in answer to an inquiry should have, in color as well as in layout, envelopes and enclosures expressing the same character as the magazine advertisement. Thus the person receiving the piece of mail will easily associate it with the advertisement.

Combining color inks with colored papers is most advisable. If for some reason colored papers cannot be used, color inks can be harmonized in accordance with the same principles.

### ***Case Histories of Color Power in Direct Mail***

Although we do not know the specific color used—that is, we do not know exactly the kind of blue and the kind of pink—these cases gathered by the Direct Mail Research Institute nevertheless illustrate the power of color in increasing results.

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<i>Test No.</i>	<i>Company</i>	<i>What Happened</i>	<i>Percentage of Increase</i>
B-109	Mail Order	Four-color stuffers outpulled black-and-white.	20%
B-111	Publisher	Two shades of blue ink on blue letterheads outpulled black and red on white, and brown and orange on canary.	27% *
B-106	Publication	Pink return envelopes outpulled blue, canary, green.	30% *
B-103	Publication	Goldenrod return envelopes outpulled pink, green, white.	40.2% *
B-114	Building Supply	Blue return cards outpulled pink, orange, cherry, green, goldenrod, buff, yellow.	42.7% *
B-107	College	Pink reply cards outpulled white.	50%
B-104	Mail Order	Pink letterheads outpulled green, buff, blue, russet, white.	80% *
B-110	Business Machines	Blue envelopes outpulled yellow goldenrod, pink, green, white.	151% *
B-112	Dress Manu- facturer	Blue envelope with pink letterhead outpulled white.	166%
B-105	Flour Milling	Cherry reply cards outpulled blue, white.	200% *
B-102	Paper	Pink envelopes outpulled yellow, green, blue, white.	400% *
B-101	Paint	Blue letterhead and goldenrod envelopes outpulled yellow letterhead and blue envelope, and white.	450% *

\* Represents difference between highest and last named.



## VII

### *Looking to the Future*





## ***Color in the Home of the Future***

With the development of the industrial revolution in the nineteenth century, the home ceased to be, for great numbers of people, a planned unit for living. Workers in industrial plants were obliged to live near their place of work in overcrowded, unsanitary conditions. The slum was born; both community and home life disintegrated. Even the suburbs were not true communities since each villa, each residence, was distinct and alone. The design of the individual house, moreover, was not created for living as much as for ostentation.

The materialism created by the early factories upset the entire cultural tradition. Art and architecture lost their natural functions, even for the wealthy. People with means sufficient to gratify their fancies therefore began to glorify the past by collecting antiques and admiring all objects that symbolized past cultures. Residences were designed with Ionic or Corinthian columns, with Gothic or Renaissance arches and elaborately carved cornices. Even the Oriental cultures were called upon for ideas that could be introduced into the home to make it distinctly different and to display the wealth of the occupants.

Actually the typical nineteenth century residences

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of the industrialists were designed for show, not for living, and since each structure was superindividualistic in its character, a group of neighboring houses rarely presented a picture of an integrated community. The dwellings in the factory districts can best be described as long rows of shacks, and they were really not fit for human habitation.

For the leisured class color became a symbol for showing off wealth. It was associated with rare stones, gold, silver and intricately designed objects of the past. For the masses, color ceased to be. The coal dust and smoke obscured all hues and tints.

While the upper classes were using antique art as an escape from the materialism and ugliness created by industry, the mill workers found their escape from the squalor of the home in the tavern. Alcohol served both as sedative and as stimulant.

After about two centuries of aesthetic denial and even material want, a number of major developments took place. The masses became dissatisfied with their ugly environment and expressed their grievances with organized action. The industrialists began to realize that unhappy workers were not efficient producers. New improved machines increased production greatly, but they required skilled personnel and meant increased wages for the employee as well as greater profits for the employer. The development of fast transportation made it possible even for factory employees to build homes a considerable distance from the factory.

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These developments are now progressing at an even faster tempo, which means a constantly rising standard of living for a greater number of people. The rapid progress in industrial production is making the shacks in the slums and the old mansions in the suburbs equally obsolete. Modern industry is now creating objects of beauty which are desirable to the rich as well as to the masses, and new building materials plus modern conveniences make it possible for all people to have dwellings fit for dignified living.

In a craft society, man's emotional life was related to his occupation. Present day industry offers opportunity for creative, subjective expression to very few men.

The increasing leisure time that the new machine age is giving us compensates for the drudgery inherent in modern production methods. Increased leisure also means more hours at home where the environment must provide emotional satisfaction.

Modern production methods are depriving man of creative outlets. Therefore, his creative instinct must be satisfied in some other way. After eight or six hours in the plant (it will undoubtedly be six hours in the near future), man must have a place where he can relax and where he can have necessary emotional expression.

The home of the future, if it is to meet the psychological and social needs of people living in an atomic age, can contain little that is traditional and characteristic of a craft society.

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To meet the new needs, all objects in the home will have to be functional, and the colors will have to be tuned to the purpose of the room and to the emotional character of the occupants. The harmonious forms and colors of the new home furnishings will contribute to the psychological harmony of family life.

A developing housing program will no doubt in the near future call for scientific color application. Architecture and interior design are slowly but surely changing their character to meet the needs of a highly industrialized society. Our modern architects and furniture designers have already demonstrated in the last twenty years that simple functional form is conducive to physical comfort and relaxation. Many homemakers are discarding the multitudinous dust catchers, elaborately carved furniture and ornate decorations.

We are beginning to understand the importance of environment to our emotional stability, and we are becoming conditioned to the new concept of utility and aesthetics, although some of us have to combat early influences which cause us to want to reject this new principle of design. The younger generation sees this new concept with clear eyes.

Psychiatrists and psychologists are expanding their studies of colors, and some of them have already introduced color as a therapeutic medium in hospitals.

Hues, shades, tints and tones are being analyzed

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and classified. These will play their respective roles in normal everyday living as our industrial, economic and social life develops.

### *Quantity and Quality in Industrial Production*

The Industrial Revolution that began in the eighteenth century made possible the production of great quantities of products. The early industrialists were concerned with the numbers of articles—not with their beauty or even with their physical quality. The aim of early industry was to get as many articles as possible out of the plant and to distribute them as widely as possible. Whereas in the craft society quality of workmanship was the road to success, in the new born industrial society quantity became the true objective.

The Industrial Revolution is coming into a new phase. We are now discovering that the machine and beauty are closely related. In recent years we have begun to combine aesthetics with mechanics because we have learned that mechanical, physical and aesthetic principles are based on the same universal laws.

The industrial designers have in recent years demonstrated that streamlining is a physical factor in performance, an aesthetic factor in appearance, and an economic factor in production. Performance,

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beauty and economy are the triplets of streamlining and are the aims of the industrial designer.

The machine of the twentieth century has aesthetic form as well as productive efficiency. And the articles it produces in ever increasing numbers are beautiful in form as well as utilitarian in purpose. To meet the demands of the present day public, bottles, plates, spoons, glasses, cups and pitchers must be beautiful as well as practical.

The demand for beauty in a product is often greater than the demand for quality in performance. Men generally buy automobiles on the basis of the car's appearance. The car's performance is either taken for granted, or the buyers feel unqualified to judge the machine's performance. But they do feel qualified to evaluate the car on the basis of its appearance. Women buy home furnishings as well as clothes not on the basis of lasting quality but for appearance, or "eye appeal."

Industrialists realize that beauty brings profits. They are therefore concentrating more and more on improving the aesthetic aspects of the products.

The modern machine has devaluated rarity to a great extent. The machine can now produce millions of objects as fine as the original. No matter what kind of a political system we think we would like to have, the machine is a regimented democrat—regimented because it is scientifically co-ordinated, a democrat because it produces millions of identical objects without regard for whom they are made.

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We are nearing a stage of industrial development when the wealthy will have no better products than the masses. The machine is leading toward increased democracy because every year it serves a greater number of people.

Although our early conditioning has molded our thinking patterns on craft principles, we must nevertheless of necessity accept the new dynamic industrial concept. Our future is unquestionably in the direction of abundance and not scarcity, and our socially awakened society will not long tolerate an artificially imposed scarcity.

The public demands quantity and quality. It wants an abundance of goods that meet psychological as well as physical needs.

So far, however, some of our finest industrial designers have failed to master the aspects of design that are non-plastic. It is true that our leading designers have learned much about modern materials and are concentrating on aesthetic form, but they have been neglecting one of the most vital factors in our environment: color.

Chrome tubing and colorless plastics are now the two favorite materials for the home and office. The physical or practical qualities of chrome tubing cannot be questioned, but the psychological effect of the cold glaring metal is, to say the least, unfavorable. Colorless plastics can best be described as psychologically negative.

No doubt tubular furniture and lamp stands of



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glass-like colorless plastic lend themselves to industrial quantity production, but they are not psychologically beneficial either in the home or office.

We can be confident that in the industrial production of the not distant future color will play an important part. Most industrialists and the talented designers will soon learn that beauty means color as well as form and that color does not mean just any color, but specific values for specific purposes.

In the near future designers will have to realize that the plastic form is only one aspect of our environment; color is the other. Only by co-ordinating simple, smooth forms with appropriate color values can we create an environment with maximum favorable psychological effectiveness.

The department store and variety store already vibrate with color. The next step is for industry to color-tune the products, that is, to have the articles in appropriate hues, tints, shades and tones. The production problem of the immediate future is two-fold, quantitative and qualitative. And by quality we mean aesthetic satisfaction as well as utilitarian service.

Although color is still generally taken for granted and the works of Newton and Helmholtz have reached only academic circles, color awareness is nevertheless increasing. The Munsell and Ostwald color systems have already been adopted by a few industries in recent years, and the findings of Dr.

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Matthew Luckiesh in the field of lighting are being put into practice in many places.

Business leaders are now aware of the power of color in merchandising, advertising and public relations, although most of them still do not know how to use color scientifically. There is already some awareness of color as an important factor in plant efficiency, although the knowledge of how to use it is still very rare.

An expanding industry and improved distribution of goods will mean more opportunity for using color scientifically. Now that we know that color has power we will learn to use it to the fullest extent.

### *The Role of Color in Transportation*

Color has long been used as a signaling device by railroads. The red and green lights along the tracks and the black and white striped gates at rail crossings are as familiar sights as the stop-and-go lights at the city's street intersections.

Recent visibility tests have shown that black and yellow stripes have greater visibility than black and white. Some safety-conscious communities are introducing the yellow and black combination not only at rail crossings but at other points of danger. The yellow and black stripe patterns have in recent years also been introduced as safety devices in industrial plants.

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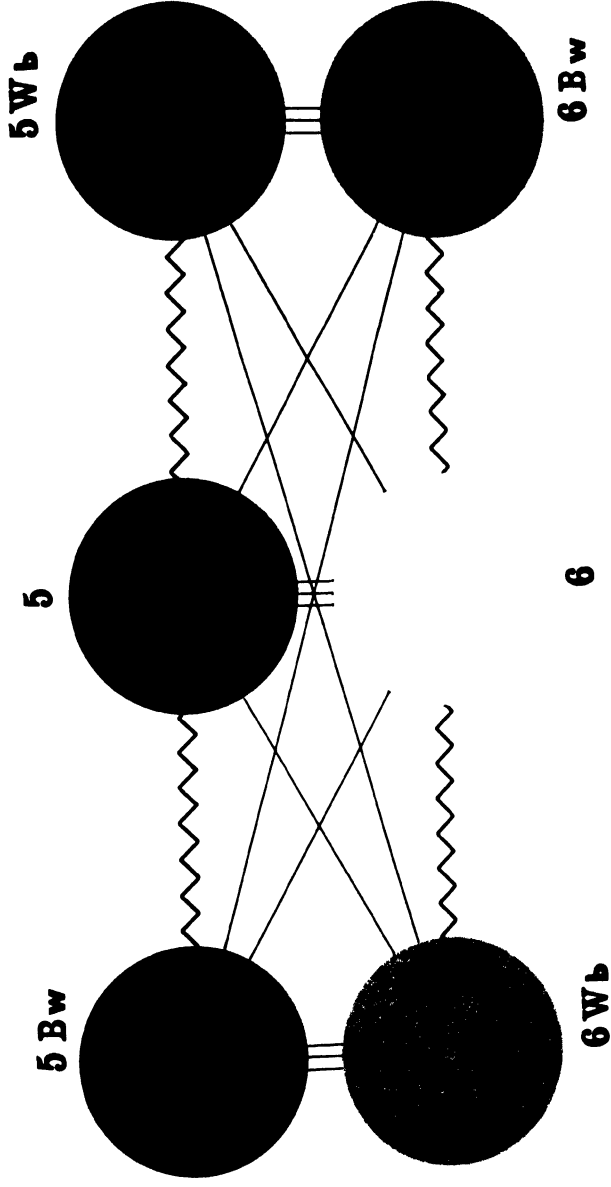
Some communities have adopted patterns of white, black and yellow, with the black stripe between the white and yellow stripes. It is true that although the yellow next to the black has much greater visibility in the daytime, the white next to the black is seen more easily under the poor lighting conditions of night. The combination of white, black and yellow is therefore an ideal safety device.

The stop-and-go signaling lights at street intersections and the striped gates at rail crossings are taken for granted, and not much conscious thought is devoted to the fact that these safety devices are colors. We are not generally aware that color light and pigment are used for safety purposes.

Color identity is another factor in transportation. The yellow cab has, in addition to great visibility, immediate identity as a public vehicle. Also, business houses are gradually becoming aware of the advertising value in adopting a specific color for their trucks.

In addition to having great visibility and identity, yellow has very strong retention power. Because of the retention power of yellow, we generally believe that there are many more yellow cabs on the street than there actually are.

The most important power of color, the psychological, is now being introduced in the field of transportation. The railroad and street car of the near future will have the psychological character of a



Complementaries, violet-blue and yellow, of pure hue and in two tones, one light and one deep.



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home. Its interior will be designed to have a favorable effect on the passengers.

The drab interiors are already disappearing. But unfortunately, the colors now generally used for covering up the cold metal are still not appropriate.

Plans are already in the making and some designs are in readiness for railroad and street cars that are veritable aesthetic masterpieces. The interiors of these cars will be smooth in surface and lyrical in line, and the colors will be tuned for relaxation.

Many transportation executives have already become aware of the fact that a vibrant color in a car interior is an emotional irritant and is not conducive to encouraging travel. The vibrant colors still prevalent in many railroad and street cars are pleasing only to the very few individuals who need highly vibrant colors and much noise to make them realize they are alive and that they can see and hear. The interiors of the new cars will be treated with cool tones to provide backgrounds that will meet the emotional needs of the majority of people.

Some of the new car interiors will no doubt be in colors that are too cold instead of too warm, depressing instead of overstimulating, but if that error is made, it will soon be corrected.

Air lines are already using the right colors in the interiors of planes. Railroad executives are now aware of the powers that colors have, and they will soon find the right tonal values to meet the psychological needs of the greatest number of people.

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### *The Art of the Future*

The traditional schools of art have no place in our society and can play no role in the daily lives of the people of tomorrow. Neither Realism nor Romanticism, neither Impressionism nor Expressionism will meet the aesthetic needs of the society of an atomic age.

At present, the artist's product is not an integrated part of our daily life. The artist creates his picture or design for no specific purpose. The usual buying-and-selling of works of art is high pressure selling on the part of the merchant and ignorance about art matters on the part of the buyer.

Many art collectors consider pictures as commodities that are safe investments. Very few really enjoy the works of art. Some collect pictures because buying them is a safe way to evade the tax collector.

When our industrial society comes of age, art will be more integrated into the home. It will have an aesthetic purpose instead of mere economic worth. It will satisfy psychological needs and not merely symbolize wealth and power.

The future of art depends on the future of society as a whole. As our social structure develops so will our art. If we put to work the recent scientific findings, we will solve our economic problems and will then take up the problem of enriching the human spirit by developing our emotional potentialities and

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increasing our aesthetic enjoyment. In the industrial society of the future the enjoyment of art will be, because of the nature of the social structure, universal and not the monopoly of the elite.

We are now in a transitional stage. The form of art is now in the process of development. It does not yet meet the needs of a highly industrialized society, and it certainly does not fit the character of an atomic age.

The art of the future will have no relationship to a person's economic status. It will know no class distinctions. And there will be no difference between the so-called practical arts and fine arts.

Fine design has already invaded the home. The kitchen as well as the living room is equipped with beautifully shaped objects. The colors can stand great improvement but the forms around us have attained a satisfying aesthetic character.

In the future the art on the walls will be just as aesthetic. It will be created primarily to meet psychological needs.

Home decoration will not be left to the discretion of a decorator, and merely being different will not be the purpose in designing an interior. Interior decorating will be replaced by color-tuning to meet the psychological needs of the occupants.

The works of the old masters will be in the historical museums and art galleries where we will go to view and enjoy these expressions of the past. But the art of past cultures will have no place in daily



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life. They cannot contribute to the emotional well being of the people of an industrialized society because they have not been created within its sphere.

Much correlation between various artistic and scientific fields already is taking place. Engineering and designing have been combined by industrial designers in creating machines, furniture and numerous articles for home and office. The next step is to correlate art and design with architecture, gearing them to create a happier life.

This means that the artist of the future will not be a purely subjective individual and free lancer. It means that he will have to base his art on universal compositional principles and on color harmony. He will have to meet the psychological needs of the prospective users of his works of art.

At this stage of progress, the wants of the people do not coincide with their needs. Our early conditioning has enslaved us to craft concepts and therefore most of us want the things our grandparents wanted. There is much gratification in being able to have things that our grandparents and parents could not even dream of possessing. There is much ego satisfaction in being able to buy furniture that formerly only kings and queens could have. And to possess an oil painting formerly owned by Napoleon is indeed an accomplishment and is very rich food for the ego.

Much education will be needed to instill thinking processes that are consistent with living in a highly

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industrialized society. Much informal adult education as well as improved school curricula is needed to impress upon the old and the young the importance of proper environment.

Materialism is still deeply ingrained in us. Many of us are preoccupied wholly with economic problems and are negligent of psychological factors and generally indifferent to aesthetic elements. And there are still those among us who must devote their full energies to gaining a bare living.

A society of abundance which atomic power will soon make a reality will direct our attention from the material to the psychological. We will then be able to take the material problems for granted and will be free to think about the psychological problems which we are now neglecting to a great extent. Aesthetic forms and harmonious colors will then have new significance for us.

Those who are alert will now begin to take advantage of the benefits of scientific color application. Some artists and designers will soon begin to consider the psychological aspects of color and form, and they will begin to create works of art that will aid us in maintaining our emotional stability in a rapidly developing superindustrial age.

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### *Fashion in an Atomic Age*

In every industry color ignorance is admitted except in the field of women's fashions. Every designer of women's fashions is a color expert, either self-styled or evaluated as such by his or her employer. Whichever it is, the designer is accepted as an expert by the clients.

All sophisticated women know that Paris is the world's fashion center. A design coming from a Paris house generally has ready acceptance and serves as a model for many less famous designers to copy. Fashion is authoritarian, not democratic. And in no other industry is the contrast between progress and reaction so evident as in the women's clothing industry.

Women expressed a strong desire for functional clothes as they struggled for social, cultural and professional equality. Fashions of the last twenty years indeed exemplify women's emancipation. Some of the clothes not only express the spirit of freedom symbolically but actually give women the same freedom of movement that men have in their apparel. The confined waists, the weighty, clumsy, multiple-fold skirts and the lacy blouses have been replaced with uncluttered, tailored suits and body-molded gowns that are simple in line and pattern.

Yet the forces that set the fashions are of such

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character that it is impossible to evaluate trends and to predict where they may lead.

After the war first reports of Paris fall collections described:

"... Watteau colors, soft and subtle grays with yellows, grays with gray mauves, pompadour pink, gray sky blues, gray with faded brown, with pressed-leaf greens . . . one-buttoned, deep armhole suits—1912 flavor . . ."

The 1912 flavor shows that some of us are certainly going places—backwards.

The Gibson Girl look, coats with Bonaparte collars, and skirts with Victorian pleatings were reported in Paris collections the following season.

Fashions do not all go back to the past, however. Modern freedom, grace, comfort, sleekness, roundness are enthusiastically advanced by many manufacturers of women's wear.

The following advertising copy exemplifies fashions in keeping with the tempo of the times:

"Supple as a mermaid! Pliant freedom where you want it; firm control where you need it . . . Grace-giving flattery in the smooth arc of the hips—the firm arch of the bosom. Fashioned with unhurried care, those superb style lines are permanently *yours* through the long life of a ——— girdle and bra!"

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Nor would anyone object to the following coat ad:

“...Luxurious swagger back flows straight from the shoulders to rippling folds that swing gracefully with every step...”

Some more advertising of modern character:

“Smart women demand comfort...the confident comfort they find in —— briefs. Made of non-run rayon tricot...these briefs are specially designed to follow every curve...their fluency touched off with lace trim elasticized for perfect fitness and smooth line.”

Another advertisement:

“...fine woolens which drape subtly, caressingly...glow in clear bright colors...inspire designers to create the most flattering fashions for you...”

In economics and in politics every progressive movement brings forth a reactionary trend. So it is in fashions. Watteau colors, Gibson Girl, Victorian and Napoleonic trends in fashions are the reaction to the simple, functional, truly modern styles. Fashion, like art, can be no different from the society in which it flourishes. We now have progressive, reactionary and nihilistic tendencies in our social life. We must therefore expect the same tendencies in fashion.

The same forces that *shape* our economic and

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political structure are also shaping our fashions as they do our art. These national and international forces are psychological as well as sociological. Enslavement to tradition is one element; the desire to escape to the "good old days" and to feed the ego are other factors in this complicated pattern of forces that set trends in thought, art and fashion.

There are also traditional and psychological reasons why men's clothes do not go to such extremes in fashion as women's. We are living in a transitional era. Neither men nor women are sure that they want women to have equality. We still see too many examples where women demand both equality and chivalry. And we see just as many examples where men choose to give the women chivalry instead of equality. Many a male who pays lip service to equality deeply prefers chivalry. His ego needs it. It gives him a feeling of superiority.

Many men prefer their sweethearts or wives to be dolls rather than partners in life. And there are still great numbers of women who choose to be dolls. A Gibson Girl costume is much more fitting for a doll than a modern tailored suit or even a streamlined gown.

Deep in the unconscious, many men still consider women as their property, as a means for their pleasure. The man, therefore, often discourages his woman from wearing form-fitting gowns that display her figure to the world. The modern business woman's tailored suit is also a symbol of equality between

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the sexes that the male with an inferiority complex does not relish.

Much education is needed before fashions will become basically logical, sensible, comfortable and aesthetic. We must get rid of our inhibitions. We must gear our thinking processes to a superindustrial age. We must learn to think of the future, not of yesterday, before we can have functional fashions.

Those of us who are in tune with the times are even now free to choose. We can now have the functional beauty of today instead of the cumbersome, gaudy, shapeless fashions of yesterday. The fashion magazines point to both roads. You can decide which you want to take.

There is nothing so beautiful as the well proportioned figure. The ancient Greeks knew it. All happy self-confident people know it. Only those with complexes want to hide it and deform it with bustles and pleats and unnatural bulges. A healthy society, healthy thinking and healthy bodies go together. Healthy, logical thinking and healthy bodies are the media for building a healthy society. Also, the cause and effect reverse themselves—a healthy society makes possible even more improved minds and even healthier bodies.

We have many advantages over the ancient Greeks. The Greek woman not blessed with a beautiful body could do little about it. The modern woman is more fortunate; she can create the effect of symmetry, ele-

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gance and streamlining with numerous kinds of girdles and bras.

Colors used harmoniously can do the rest in glorifying the human form. The co-ordination of an undulating, rhythmic figure with the beauty that comes from the sun is a most glorious thing to behold.

Like women, men too have a choice. They can encourage their inhibitions and pamper their complexes with drab and awkward clothes, or they can express themselves freely, release their feelings and be their natural selves by dressing in sensible, comfortable and colorful attire.

Sunlight and color can enrich our lives. Sunlight gives health and beauty to the body and raises the spirit. Color, the offspring of the sun, can stimulate or relax.

Colors will do what we want them to do. But we must channelize them as we do other powers. To get benefit from color we must harness it as we do water, coal and oil.

Colors do things against us if we don't channelize their powers to do things for us. What colors can do for you depends on you, on your willingness to acquire knowledge about the nature of color and to utilize that knowledge.

Men's fashions of today are not the fashions of an atomic age (which is still in its infancy), but neither are they the fashions of a past century. Men's suits are heavy and in some ways clumsy, but their worst feature is their drabness.



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As we advance socially, as our industrial progress gives us increasing leisure, our clothes will become less formal and more comfortable, more appropriate for participation in leisure time activities.

The most functionless article of the masculine wardrobe, the tie, is destined to disappear like all other objects that have no real purpose. The stiff collar left us for good and the tie will follow. When we learn to wear suits that have true color, we won't need the tie.

Hollywood has taken a lead in colorful shirts and slacks. The rest of the country will soon take up the trend. And perhaps some day the entire world will embrace the colorful spirit. Of course they'll have to get their food first. But after the body has been fed, the soul must be cared for.

Fashions for the junior miss show no traces of the nineteenth century. Magazines feature elegant, comfortable day dresses, simple evening gowns and informal togs for recreation. Line, movement and color characterize fashions for the younger set.

An ad in one magazine for the teen-ager shows two girls dressed in gypsy style blouses. But significantly, it is the functional aspects of the gypsy costume that have been incorporated into these blouses. The designer has borrowed the free, loose, comfortable style, not the strong, shrieking colors that the Bohemians wear. The American girl is color minded but, unlike the gypsy, she does not wear the entire rainbow at one time. And unlike her older

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sister, she does not want to live in the nineteenth century. She looks ahead with confidence and optimism. Her tastes are for the functional things of life.

The American junior miss is conscious of her figure and wants clothes that display it to best advantage. She has nothing to hide. She is free to express herself in her thoughts, in her conversation and in her choice of clothes. Because she has no inhibitions she uses color freely as an attraction medium, as a stimulant for herself and for others. The youthful taste in clothes fits the tempo of a superindustrial society.

The clothes of teen-age boys are also informal and colorful. Tan, blue and yellow shirts with tieless collars are popular with young men. Colorful leisure jackets are the vogue.

However, the boys are less concerned about matters of fashion than the girls. For one thing, they still have greater economic responsibilities to consider. They have more material problems for which they have to prepare themselves. But this is not a permanent situation by any means. When our economy is geared to fit our modern industrial production so that the young men's energies will not be wholly absorbed by economic problems, they will naturally turn to aesthetic interests.

A society cannot long tolerate want and overabundance side by side, starvation and waste next to each other. With atomic power a reality, we can either

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use it to solve our economic problems and create a rich, stimulating and cultural life, or we can destroy ourselves with it.

Little space can be given here to economics and industry. But it must be insisted that unless we have walls we can have no colors around us, and we can have no beautiful clothes if we are reduced to the necessity of living in caves, hiding from atomic bombs.

Fashion, like art, is a wonderful mirror of the social structure in which it thrives. Study the works of the young writers and painters and observe the tastes of our youth, their manners and their clothes, and you will catch glimpses of the future.

### *Physical and Psychological Functionalism*

Language is by no means a perfect medium of communication. We have specific images of words only on rare occasions. Art, like love, means one thing to one person and has an entirely different significance to another.

"Modern" is one of the multitude of words that have no distinct form and therefore cannot be objectively visualized. To one person "modern" means, "You know, that crazy modernistic stuff." To another it signifies chairs and tables made of tubular steel. To a decorator of my acquaintance "modernism" consists of an abundance of curves and angles

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strewn all over. And there is the concept of modernism which symbolizes the beauty of simplicity, restfulness, comfort and cleanliness.

All new phenomena are intruders. They interfere with our habits. They create new problems. Some new burdens are forced upon us—but why should we go out looking for new designs, why new furniture when the old is still good and strong?

The fact is that design enters our daily life without our searching for it. Modern design is now in the morning newspaper and in the magazine, in the store window and on the street. We wear modern design, and we ride in streamlined cars. We just can't escape it.

The reason for the rapid progress of modern functional design is its fitness for modern life. If we accept life in an industrial society, we must embrace its products. If we want fast automobiles, we are obliged to accept the streamline which is a factor in locomotion as well as in beauty. Even if we do not recognize the aesthetic value of the streamline we must accept it for its mechanical quality.

If the housewife insists on belonging to cultural groups, literary clubs, art leagues and civic organizations, she does not have much time left for house cleaning. Her home must therefore be furnished with modern pieces to minimize the housekeeping burden. The simple modern design also provides a restful environment which is appreciated after a hectic day.

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Functionalism is the basic principle of truly modern design, but, like every new movement, modern art and design are overrun with frauds. Much so-called "modernistic design" is plastered with a multitude of non-functional gadgets and gaudy trinkets.

Architects often look upon functionalism purely as structural fitness; many engineers still believe they can live in a completely mechanized world; some artists insist on living in a world of art; and often we find a sociologist recognizing only the economic phase of life. Thus a narrow functionalism embracing only one field of human activity is thrust upon us by overspecialization, as if man were ever so limited.

We know that man is not either physical or emotional. Human beings are not either economic or spiritual. Men and women are the sum total of all these aspects of life. Therefore, design cannot be purely physical but must also have psychological function.

We need food for our souls and spirits as much as for our bodies. The greater part of our budget is not spent on biological needs. We can survive on a diet of water, bread, raw onions and pork. But as civilized beings we do not choose to. We could live in caves; instead we prefer to redecorate our apartments once a year.

Modern design fulfills our needs. And only design that is functional can be truly modern. And by modern we do not mean merely "something differ-

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ent," an abundance of abstract shapes or an array of carved, distorted forms or shrieking colors. Nor is it modern to have chromium plated steel in the bedroom. Modern functional design in the home must meet our material, spiritual, physical and emotional needs.

Too many people still look upon functionalism as merely physical or material quality. When we become aware of the integrated relationship between the physical and emotional aspects of life, we will recognize that objects must be psychologically as well as physically appropriate to be truly functional.



## VIII

### *Express Yourself with Colors*





## ***You Too Can Paint***

Are you one of those who say, "I can't draw a straight line"? Wonderful! Straight lines are seldom used in art.

You have learned to do other things, and you can also learn to paint. Why not start expressing yourself and create your own beauty? You can join a class in one of the professional art schools; you can attend adult classes in evening high schools or colleges. You will benefit by attending a center where a model is provided and where you will be in contact with other painters and an instructor. But you can paint by yourself if you follow the principles outlined in this book.

You will be surprised what fun it is to take a mass of paint and convert it into a thing of beauty. Ask one who paints. Among other things, you'll learn that painting co-ordinates your muscles, stimulates your emotions and brings happiness. When feeling discouraged, low, just paint.

The notion that you must have special talent to be able to paint is a fable that has no place in our society. You'll never know how great your aptitude for creating art is until you've tried.

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### *Learning to Draw*

Before beginning to paint you should learn to draw fairly accurately. But it does not mean that you have to become an accomplished draftsman or anatomist, as some people seem to think. After you have learned to delineate simple objects, you can begin to use oil paint.

Whereas in painting you deal with mass, in drawing you are confronted with a line medium. Some artists are superb in handling masses of pigment but do not do very well with line. Others excel in line media, such as etching, but are second-rate in painting.

You have learned to write, and you can learn to draw simple objects. What most people understand as inability to draw is actually inability to see. When a beginner draws the human figure five heads tall instead of seven or eight, it is because he has not been trained to see proportion, not because he cannot draw.

Distinct style in drawing characterizes a great artist. Mere delineation of an object shows only the ability to see related forms and spaces.

The procedure of learning to draw is not much different from learning to write. You learn to observe the proportional relationship between the planes of the object and to handle the pencil in putting the related shapes down on paper. You first

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learn to relate two simple planes or forms, then four or five and finally the numerous parts of the human figure.

Composing pictures is basically no different from composing sentences, paragraphs and chapters. Just as a literary piece can consist of a sentence or of many chapters, so an art work can be made simple or complex; it can be a small sketch or a large painting.

We should remember that perceptions depend on associations. Comparing the dimensions of the head with that of the arm, of the length of the arm with that of the leg is a process of association. We learn to draw the figure by acquiring the habit of associating one part of the figure with the other parts.

We generally see things if we know what to look for. Understanding principles of light and shade, perspective and anatomy is a great aid in drawing. We recognize a tonal value if we know that it should be there. Knowing that a line should go in a certain direction helps us see it in that direction. Knowing where a specific muscle is situated helps us find it.

However, although it is necessary to understand the anatomic structure of the human figure before one can draw it realistically and with anatomical accuracy, any one with average ability and intelligence can learn to draw simple forms merely by learning to relate planes to each other.

And after the simpler forms have been mastered, you can easily learn to draw the human figure to

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meet aesthetic standards—that is, you can learn to express the significant form characteristics and the even more significant movements of the human body.

### *Choosing a Subject*

The photographer cannot eliminate realism at will. He can choose his subject, but he can modify it only to a very small degree. The painter is free to do anything he pleases with the subject. He can make it even more “real looking” than the actual subject, or he can convert his subject into abstract form and color.

One thing we should keep in mind is that it is not the subject that determines a work of art. The art is in the composition, in the way the colors and forms are handled, in the style and in the technique. Painting realistically or, as some people term it, photographically, is not art. The literal representation of objects has its place in art, but it should not be mistaken for the aesthetic expression.

A work of art depends on its own organization of colors and forms, not upon the subject matter. Many subjects no doubt produce emotional effects. But in art the forms and colors of the specific work must in themselves create the emotional effect.

Art composition is based on universal, natural principles, not on the nature of organic life, the

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image of man or animal. Any subject meets the needs of the artist if it provides varied forms and colors that lend themselves to the expression of movement, harmony and unity.

Variety and movement are elements of the entire universe, and so are harmony and unity. In other words, the elements of a work of art have in diminutive form the same relationships as do the elements of the universe.

Beauty embraces variety, movement, harmony and unity. When an artist composes he aims to create a complete unit, a tiny copy of the universe. And since it is the composition that determines a work of art, in considering a subject, you should seek significant forms and inspiring colors, not mere details.

Although it is the abstract character of art that determines the aesthetic quality, there actually is no such thing as pure abstraction. No matter what shape you make, it will resemble some real object. A round shape will symbolize an orange; an oval, a plum; a triangle, a hill; and a rectangle, a box or a house.

We live in a physical, organic and material world, and it is futile to try to escape it.

No matter how abstract you want your picture to be you will not be able to conceive a form that is not found in your environment. However, the forms you find are generally disorganized, and as an artist your goal is to compose them into a unified whole.

The choice of subject is important in art because it provides the basic forms, colors and movements.

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The realism in a work of art has many psychological and social values, but it is not an aesthetic factor.

### *Composition*

Composition is the art of organizing various elements into an orderly unit. Remember that to compose means to organize.

The tempo of the movements of the lines and forms, the relative intensity of the colors, and the proportion of distribution of the color values, tints, tones and shades decide the character of every pictorial composition.

Keep in mind that variety, harmony, movement and unity are the basic essentials of all composition. Every work should have these basic elements.

Other aspects of composition are principality and subordination, repetition, contrast, balance, parallelism, consonance, transition, continuity, alternation, gradation, abruptness and opposition.

Every painting should have the four basic elements—variety, movement, harmony and unity—plus some of the subordinate elements listed above.

Decide which of the four distinct types of graphic composition fits your personality best:

1. The dramatic that has a maximum of contrast, opposition, transition and contrast.
2. The lyrical type that has a maximum of alternation, gradation and consonance.

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3. The static kind that has a maximum of balance and parallelism.

4. The passive that has a maximum of repetition and continuity.

The following descriptions will help you decide the type of composition you should aim to create:

The forms and lines in a dramatic composition leap and drop abruptly, then rise again. Light tints are juxtaposed against deep shades.

A lyrical composition is vibrant and delicate. The lights and shadows merge softly. The color gradations are subtle. The tints merge into tones and the tones into shades.

A static composition lacks movement and is usually symmetrical. It produces an effect of rest and is, therefore, an outstanding characteristic of architectural design.

The passive type of composition is better known as design or decoration. It is smooth and soothing. The all-over pattern is the best example of passive composition. It is repetitious and continuous and, therefore, unarousing but pleasing.

### *Composing a Landscape*

The first outdoor painting or sketching trip rarely meets with success. We know that our world is a perfectly composed cosmic entity, but the little lake or the distant mountain presents no such unity. The



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artist is obliged to compose his own orderliness, for there is no composition in the panorama before his eyes.

Before him is spread a great diversity of forms and colors which must be organized into a unified whole. There are many curving lines which have to be given direction and a multitude of colors that should be tuned to their neighboring hues.

We know that every work of art must have some degree of variety, movement, harmony and unity. But it is also advisable to guard against some of the things a good composition should not have. The following "commandments" will help the beginner:

*First Commandment:* Avoid straight parallel lines. They present no variety. There isn't much adventure in a straight line.

*Second Commandment:* Do not concentrate all forms of one type on one side of the picture and a group of forms of another type on the opposite side. Putting a number of houses or cottages on one end and a cluster of trees and bushes on the opposite end is a sure way of killing the unity of your composition. The angular character of the houses has little or nothing in common with the character of the trees and shrubbery. The colors of the two subjects are also likely to be unrelated.

*Third Commandment:* Do not have a major form in the middle of the picture. Your composition may go from left to right or from right to left but the center should always tie both ends of the composi-

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tion smoothly. You may have a dramatic break toward the left side or at the opposite end, but not in the center. The easiest way of breaking the unity is by cutting off the smooth movement of the eye in the middle of the picture. You might get two pictures that way, but you will not have one composition.

*Fourth Commandment:* Do not put all the interesting forms or colors on one side and leave flat space on the opposite end. The picture will finish where the interest ends. Flat space will not provide a stimulating effect in a picture, even if it was that way in the subject you painted. People won't know and won't care where you got your subject. They'll see only your picture.

*Summing Up:* In composing a landscape, we should avoid lines parallel to the edge and guard against splitting the types of forms and colors into two distinct halves. We should not put any distracting form in the middle of the picture and must not concentrate all of the interest on one side. Watch these rules and look for variety, movement, harmony and unity.

### *Composing a Street Scene*

A painting (or photograph) is beautiful because it is composed in accordance with certain principles. It is not the subject matter that makes a work of art, but the arrangement of the forms and the distribution

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of the colors. A well composed work of art grows on you. The movement of the forms, the richness of the shades and the brilliance of the tints take on new meaning each time you look at the picture.

You can make dramatic pictures or lyrical ones or you can make beautiful patterns that are passive and relaxing. It is all in how the picture is composed.

The street has a multitude of pictorial possibilities. The lyrical winding of distant street lamps, the perspective of the receding lines in the buildings, the passing cars and pedestrians provide much material for pictorial composition.

A mere record at a normal angle of the very busy street will not hold anyone's attention very long. But your subject can be approached from a high angle, looking down, or a low angle, looking up. You can paint the subject from the left side or from the right. The angle is an important factor in making a successful composition. It is up to the artist to choose an angle of view in which the leading lines guide the eye into the picture.

The normal or usual angle does not produce a dramatic effect. A high point of view on the other hand has many steep and sharp directional lines and a great number of interesting shapes not seen from the normal angle. While the normal or usual angle can express a psychological sensation of ease and familiarity, the high or low angle can produce a rousing psychological impression.

A most dramatic composition can be achieved by

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diversity of angles and forms and sharp contrast in light and shade. The steeper the angle, the more variety of form, and the greater is the dramatic effect. However, there must be caution. Perspective that eliminates distinctness of the individual forms is aesthetically negative. Each form must be significant in itself in order to play a part in the composition.

### *Composing a Portrait*

Before beginning to compose a picture, you must decide what you are after. If you are interested in producing a purely pictorial effect, you will have to treat your subject one way. If it is a portrait you want, the compositional problem is entirely different.

In portraiture, you should first of all see that nothing competes with the subject you intend to paint. An intricately designed background may be very interesting for another composition, but it is sure to detract from the sparkle in the eyes of your pretty model. A beautiful winding brook may make a fine scenic study, but it will certainly not help your portrait. The tailor's intricate handiwork may aid in creating an effective composition, but it takes the interest away from the subject. Most effective portraiture is achieved when the head takes up the greater part of the space.

Big empty spaces detract from the subject as much

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as do crowded ones. Each part of the background should be simple and small but interesting. Avoid perfect rectangles or squares; they are static and therefore uninteresting. No two parts or forms should be of the same size. Remember that variety is the spice of pictures.

Shadows on one side of the face and light concentrated on the other will give your portrait depth. The lighting can be very contrasting, deep shadows against brilliant highlights, or the values may be soft, passing gradually from light tints to tones to deep shades.

Action can be achieved by posing the model at an angle. Pictorial action does not necessarily mean that the subject must be doing something. A dramatically composed still life can express more action than a picture of an athlete racing across a blank space.

### *Aerial and Linear Perspective*

As the forms in a landscape recede they become smaller, colder (violet-blue) and fainter. The representation of form as it is modified by distance in size, hue and value is called aerial perspective.

Distant mountains appear blue because numerous particles of dust and vapor in the atmosphere break up the short waves of violet and blue light. The blue of the sky also is caused by the scattering or breaking up of the violet-blue light waves. The particles in

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the atmosphere are not large enough to scatter the longer waves of green and red.

Because the eye is rounded and we see all things through a curved surface, objects do not appear to us as they actually are.

If you look into a convex mirror you will see changes in all the dimensions of the reflected objects. The convex mirror alters the direction of the lines even more than the eye does.

However, we become accustomed to seeing objects in perspective from infancy, and we never think that lines are curved or that they are not parallel to each other because they appear that way to the eye.

Perspective drawing means depicting objects not as they actually are but as they appear to the eye.

To a person standing on a railroad track, the rails appear to meet. But we know from experience that actually the rails are parallel to each other. It is the rounded lens of the eye that causes the rails to appear as if they meet at a point.

All parallel lines meet at a point on the horizon. In looking at a house on a street, the parallel lines of the roof above the eye level appear to come down to a point. The line on the ground appears to go up to the same point. In looking down at a house from an elevation, all the parallel lines lead upward to a point on the horizon.

A picture can have only one horizon line. This imaginary line of vision is determined by the eye level. It is arbitrary where this line is to be in a pic-

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ture. A composition with normal eye level is generally not very intriguing or stimulating. In most dramatic compositions the line of vision is either very high or very low in the picture. In other words, your picture will be much more interesting if you paint it looking up at the subject or looking down at it, not viewing it at the usual level.

### *View Finders and Frames*

The camera will photograph everything before the lens. The painter on the other hand has the advantage of being able to include or eliminate any of the forms before him. He is at liberty to add a tree or leave out a barn if he finds that his composition would be improved by the rearrangement.

The painter can be individualistic in his rendition of forms, in his color choice, and in the technique or application of the paint, as well as in the composition. The photographer's medium is much more limited.

But the use of a view finder as an aid in composing is one thing that the painter can learn from the photographer. It is an invaluable aid in landscape painting.

The photographer looks into his finder, moves his camera back and forth, left, right, and finally strikes a well organized group of forms. The painter should also use a view finder as an aid in composing because

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with a finder, the diversity of forms and colors can be seen as a unified whole.

Psychologically the view finder has the same function that a frame has. The belief used to be that the purpose of a frame was to enhance the work of art; therefore it was looked upon as an ornate border and was elaborately carved and extravagantly gilded. It used to be that frames were so delicately ornamented that they could not be exposed to touch, so painting and frame were encased in a glazed box.

We know now that the function of a frame is not to decorate a picture but to set it off. An ornate frame directs the eye around the picture instead of into the pictorial composition. A simple frame unifies the picture and directs the focus of the eye to the painting or photograph. The primary purpose of a frame is to separate the work of art from surrounding distractions.

Because framing devices tend to produce an effect of unity, the view finder is a valuable aid in composing a picture, and the frame is an important factor in the effectiveness of the finished work of art.

### *Chemical and Physical Characteristics of Pigments*

To the physicist, wherever there is light there is color, whether he sees it or not. To the chemist, wherever there is matter, there is color. He does not



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actually have to see any hues. For the artist, color exists only when he can see it.

However, the artist should be aware of the chemical and physical characteristics of colors.

He should be familiar with the ingredients that the chemist uses in making the color. Many a fine work of art loses its full meaning in a few years because the color fades. Artists should not use fugitive colors, and they should be familiar with the chemical characteristics of pigments in order not to mix colors that have no chemical affinity.

Lake compounds should not be mixed with lead, copper or earth colors. Sulphur colors should not be mixed with lead or copper colors.

A lake color is a compound of organic pigment on an inorganic base. Alizarin crimson is a lake color. It is a coal tar derivative. Rose madder, derived from the madder root, is about the same in hue as alizarin crimson and is a pigment that can be mixed freely with other colors. It is an absolutely permanent color.

Vermilion is made of mercury and sulphur. There is an imitation vermillion based on chromate of lead. It is a fugitive color and should be avoided in the fine arts.

Cadmium red consists of cadmium sulphide and cadmium selenide. Cadmium red (light) is an orange-red, cadmium red (deep) is a magenta red similar to alizarin crimson and rose madder. All cadmiums are absolutely permanent.

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Sienna is a brown-red earth color. Both raw and burnt sienna are available. The burnt sienna is richer in hue and goes further in mixing with white into warm tan-pinks. Venetian red is another earth similar to sienna. All earth colors are absolutely permanent.

Umber is a deep brown earth color. Both raw and burnt umber are available. The burnt umber is the richer of the two for mixing with white into light browns or tans.

Cadmium yellow, derived from cadmium sulphide, is the best of all yellow pigments. Cadmium yellows range from a cool lemon yellow to a very warm orange-yellow. Chrome yellow is a common substitute for cadmium. It is a lead chromate color that is not absolutely permanent. Yellow ochre is a neutral yellow. It is an earth color that is absolutely permanent.

Cobalt blue is based on a metallic element and is an absolutely permanent pigment.

Ultramarine blue is a violet-blue that is fast to light, but because it contains sulphur it should not be mixed with flake white, cyanine blue or chrome yellow.

Cerulean blue is chemically related to cobalt blue. It is an absolutely permanent pigment. Cyanine blue is an imitation cerulean. It is a derivative of copper phthalocyanine and should not be used on the palette together with ultramarine blue.

Viridian green is a cool green based on chromium

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oxide. It is absolutely fast to light. Emeraude green has the same hue and is chemically the same as viridian, but it is more opaque. Terra verte is a neutral green earth that is absolutely permanent.

Ivory black and lamp black are both carbon pigments. The ivory black is more transparent than the lamp black.

Titanium white is a metallic element that is absolutely permanent and is the most opaque of the white pigments. Zinc white is an oxide of zinc. It is absolutely permanent and is semi-transparent. Flake white or white lead is a carbonate of lead product that has great opacity, but it is a poisonous pigment and turns dark. It should not be mixed with sulphur or lake colors.

The physical characteristics of colors are equally as important as the chemical properties because the appearance of a color depends on its environment and on the type of illumination.

A color changes its character not only by actual mixture with another pigment but also by juxtaposition with another color. Green appears darker and bluer next to yellow and lighter and more yellow next to blue. A red looks much redder next to green than next to any other color. Green looks greener against pink than it does against a green tint. A neutral gray becomes pinkish next to green and greenish next to red. A pink looks mild next to red and rich next to green, its complementary hue.

Not only does the color change in hue but also in

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value. Gray looks darker against white and lighter against black. A tone looks darker against a tint and lighter against a shade.

As was brought out at the beginning of this book, yellow light makes surface colors warmer, while cold light makes them cooler. Yellow illumination, or warm light, will gray an ultramarine blue. A cold light, or daylight, will make a green appear much bluer than it is in warm light.

It is evident that in using colors we must give consideration to the chemical nature of the pigments because of the effect colors have on each other in subtractive combinations, that is, in actual mixing of the pigments. And we should also be able to recognize the pigments that are not permanent.

It is equally evident that in using pigments we must realize that all colors have an effect on each other when placed side by side and that their appearance is governed by the type of illumination.

### *Painting in Oils*

It has been explained in this book that with the three pigment primaries we can mix all the colors we want. However, we can make painting much simpler, more enjoyable and less costly by taking advantage of some of the more neutral pigments, particularly in the family of earth colors.

Instead of using expensive cadmium red and black

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for mixing browns and tans, sienna, umber or Venetian red can be used. These earth colors are much less costly and just as permanent as the cadmium red.

It is also advisable to keep black off the palette because it often muddies all the colors. When you need black, you can mix it yourself with two complementaries or the three primaries, or produce it by mixing one pure hue with an earth color. Ultramarine blue and yellow ochre will result in a rich black. Ultramarine blue and burnt umber also make a deep rich black. By using the earth pigments you save the costly yellow and red for tints and shades that cannot be derived from the earth pigments.

Painters find it advisable to use the costly colors—cadmiums, cobalt and viridian—and cut expenses by adding the earth pigments to the palette.

In other words, for reds use rose madder or deep cadmium instead of alizarin crimson, and light cadmium red instead of vermilion.

For yellows use cadmium yellow (medium) instead of chrome yellow, and add yellow ochre to your palette for mixing yellow tones.

For blues use ultramarine blue, cobalt blue and cerulean. Avoid such blues as Prussian blue and permanent blue.

You can mix all the greens, but you should add viridian or emeraude to the palette. It is cool and rich and will save you many complicated mixing problems. For green tones it is advisable to use terra

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verte or earth green and save the viridian or emeraude for the tints.

Burnt umber, burnt sienna or any other earth brown-red color will complete your palette. Do not use any neutral tone pigments that are not earths.

You will need a great quantity of white for mixing tints and tones. Therefore, you should get your white in pound tubes and the hues in studio size tubes. Use titanium or zinc white. Avoid flake white or lead.

If your painting technique is thin, use the transparent pigments instead of the opaque. Viridian is more transparent than emeraude. Rose madder is more transparent than cadmium. Zinc white is more transparent than titanium. If you like to paint in heavy impasto, by all means use the opaque pigments, emeraude, cadmium and titanium.

Unless you paint in a very heavy impasto, you will want to thin your pigments. Some painters use only turpentine for this purpose. Others use the turpentine only for washing their brushes and use bleached linseed oil for thinning the paint. Still other artists use 50 per cent oil and 50 per cent turpentine. Some painters add drier to the paint. One-third bleached linseed oil, one-third turpentine and one-third copal varnish is an ideal thinner.

In arranging the colors on your palette, it is advisable to put the dabs of pigment at the edge, starting with the coolest and deepest color and ending up with the warmest and lightest at the right back part

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of the palette. The following order is suggested: ultramarine, cobalt, cerulean, viridian, terra verte, burnt umber, burnt sienna, cadmium red (deep), cadmium red (light), yellow ochre, cadmium yellow. A streak of white pigment may be placed through the entire length of the palette in front of all the colors.

The human mind can grasp only one thing at a time. Therefore, don't try to get your form and color at once. Use three steps in building your composition.

*Step one:* Compose your picture in line. First use charcoal that can be easily wiped off. After you have decided that the charcoal lines are as they should be, apply an ordinary pencil right over the charcoal. Then wipe off the charcoal so it won't blacken your colors.

*Step two:* Mix the basic colors. For example, if you are painting a summer landscape with a yellow house and a few trees, mix green with viridian and cadmium yellow or cerulean and cadmium yellow. Mix the color for the yellow house with yellow ochre, cadmium yellow and white. Lighten the burnt umber and burnt sienna with white for the trees. Now dilute or thin your paints and apply these colors to the canvas or board at the places designated by the lines.

*Step three:* What you are going to do now depends on the technique you want to use. You can mix numerous tints, tones and shades of each basic color in your picture and blend them smoothly on top of

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the base colors, or you may want to do the entire composition in simple flat colors. You may apply the tints, tones and shades in heavy, large strokes or in tiny impressionistic strokes. You may finish your composition by applying your paint with a palette knife.

In painting a portrait, the same three steps should be followed. First, do your portrait in line. Then render the head in large simple masses of tints, tones and shades of sienna or umber or any other neutral warm color. Then you are ready for the flesh color and the little details of the portrait.

Never try to do a likeness when you start working on the canvas. You'll be disappointed. You'll never get it. Artists don't work that way. You will learn to paint a portrait in a short time if you follow the procedure of composing your picture in line first, working in large, broad, contrasting light and dark masses second, and applying the details and subtle colors last.

For your first painting experience, you should choose still life as a subject. After you have done two or three still lifes, try a few landscapes, then portraits and finally figures.

A painting can be finished in one session, two, three, four, five or even more times. The paint should be given sufficient time to dry between the painting sessions.



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### *Water Color Painting*

In water color painting one may use the same colors as in oils, with the exception of white, which is replaced by the white paper.

The charm of the water color medium is that it is transparent and luminous. Pure aquarelle has a freshness possessed by no other medium.

However, water color cannot be used for painting details. It does not have the flexibility of oil paints.

Water color is an ideal medium for landscape painting because it lends itself to expressing light and atmosphere. And if a rough textured paper is used, the atmospheric quality is even better.

Thin washes of water color tints permit the white paper to shine through to create a brilliant and scintillating effect.

Before applying the colors to the paper, one should outline the composition in pencil. Detailed drawing, however, should be avoided if clear, crisp color is desired. Many pencil lines often muddy the colors and rob the painting of brilliancy.

If you are interested in preserving your work of art for posterity, you should use pure rag paper.

Do not put many washes over each other. It's a sure way of ruining a masterpiece. No more than three layers of color should be put on the paper in aquarelle. The deep shades and accents are to be put

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in after all the tints and tones have been placed on the paper.

At this point it is advisable to note that water colors are only for children and for experienced painters. For sheer color expression, water color is a wonderful medium. Water color painting is a constructive and joyous activity for a child. It provides a channel for emotional expression and for energy control. But if you are an adult you will want to express the reality of life, to depict the real objects around you. You will want to build three-dimensional forms in your paintings. For that, you have to be a master of the water color medium.

If you have never painted, do not start with water color. If you do, you will be very disappointed in the results and you are likely to get discouraged.

In water color painting you have to be able to visualize the finished picture before you put down your first stroke. Although you can build up your tints with two or three layers, your shades must be right the first time. Putting one deep shade over another will disintegrate your color value. Tones are less difficult to handle than shades, but they need more care than the very transparent tint washes.

It is well to keep in mind that in painting with water colors the white that is reflected through the thin layer of color converts the hue to a tint. To produce tones and shades, the colors do not necessarily have to be mixed. Some of the pigments are neutral, therefore a tone or a shade can be created

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merely by diluting the pigment with very little water. For example, a wash of cadmium yellow is a tint whereas a wash of yellow ochre is a tone and a wash of burnt umber can be a shade if the white of the paper does not come through.

When you are beginning to paint you should use oils, a medium that is much easier to control. An error in oils can be easily corrected. You can remove the color with the palette knife or you can wait a few days until it dries and paint over it. You cannot correct an error when working with water colors.

However, if you have done some painting in oils, try water colors. It will give you a new thrill. Water color is a quick working medium. If you can devote only a little time to the practice of art, change from oil to water color and you'll get more pictures finished.

### *Harmonizing Colors*

In addition to variety of forms and movements, we must have a variety of colors if we are to produce a stimulating painting.

It is generally advisable to have a diversity of hues, tints, shades and tones in a painting. But you may want brilliant colors or neutral colors. You should choose the colors that express your own personality.

In harmonizing the colors, however, you should always remember that when pure complementary hues are placed next to each other, they have a tend-

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ency to vibrate and create an unpleasant effect. Best contrasts are achieved by placing complementary shades and tints next to each other, or shades and tones, or pure hues and tints, or pure hues and tones or shades. In other words, the complementary colors should be contrasting in value.

Do not put pure yellow next to pure blue or pure red next to pure green. If your yellow has to be of a pure hue, have the adjacent blue of a deep shade, tone, or tint. If your green is of a pure hue, have your red of a deep shade, tone, or tint.

In a landscape you may have a scale of about a half dozen or a dozen values of green. You can give these green values additional richness by introducing a few spots of a cool red like rose madder or deep cadmium.

A sky consisting of a dozen values of green-blue can be given additional brilliance by a few sparks of orange-red in the landscape against the sky. And a sky of violet-blue tints and tones is given additional effectiveness by adding a few spots of yellow.

Even a gray sky, or gray background in a portrait, still life, or abstract composition, can be endowed with rich tonality merely by introducing a pure pigment. As was already brought out, red will make the gray appear greenish, yellow will give the gray a bluish tinge, and blue will make it yellowish.

Always remember that complementary hues and contrasting values are basic factors in painting. The

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appearance of each color in your painting depends on its environment.

### *Technique and Style*

The experienced artist is not concerned about either technique or style. They are as natural to him as speaking his mother tongue.

When first beginning to paint, it is advisable to try a number of techniques. Paint your first six pictures in six different ways. Paint one in a very smooth manner with transparent pigments. Paint the second one with looser strokes. This time don't blend your colors together too much. Do your third picture without thinning your paint, but use the same large, loose strokes. For your fourth, use small brushes and break your colors even more, as in a mosaic. For your fifth painting, try the Impressionist technique of putting next to one another tiny strokes of paint that mix in the eye at about six feet. The sixth picture do with a palette knife. Don't use brushes at all. Do all the modeling on the canvas as well as the color mixing with the palette knife.

Then you will be ready to decide which of the six techniques you like best, and you will be able to choose the one that is the most natural for you. Remember that you will never know which comes the most naturally if you have not tried the six distinct techniques first.

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After you have learned to make your brushes (or palette knife) and colors do what you want them to do in your chosen technique, you will begin to develop a style in painting. Your entire psychological make-up will appear on the canvas or board. Your personality will determine the nature of the forms, the characteristics of the colors and the tempo of the composition.

Remember that style comes only after you have mastered your tools, after you have had enough practice and can make your brushes and colors behave as you want them to.

If you are still feeling your way, if you are not sure how to mix the color you want or the color that is called for by the subject, you are not yet ready to express your personality in painting. If you can't make your brush do what you want it to, you are not really expressing yourself.

Too often people mistake lack of skill for originality, ignorance for profundity, and audacity for genius.

Many pictures that are called modernistic are actually merely poorly painted. There is a great difference between a planned abstraction and an attempt at realism that ends up in a meaningless conglomeration of ugly masses and revolting colors.

Try several painting techniques; then choose one and stick to it. Develop it and master your medium, and you will in time begin fully and truly to express yourself.

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### *Mixing Colors*

Colors cannot be specifically identified with words, not even the pure hues. The color that the artist calls orange the physicist and lighting engineer call red. The color that the artist calls violet those who deal with light call blue. There are many dozens of tans, browns and yellows, and what one person will call tan another will name beige.

Because color names are generalizations and do not have exactly the same meanings to all people, colors should be seen, not merely talked about.

Some books tell exactly how much of each color to use in mixing other colors. But no two manufacturers make the same kind of ultramarine blue or the same kind of vermilion or the same kind of any pigment. Pigments produced by different manufacturers vary in purity, richness and strength. Therefore the following table gives the contents of colors without specifying exact amounts.

<i>Alabaster:</i>	A touch of cadmium yellow mixed with a large amount of white.
<i>Aluminum:</i>	Burnt umber, ivory black, much white.
<i>Amber:</i>	Cadmium red, yellow ochre and much white, or burnt sienna, cadmium yellow and much white.
<i>Apricot:</i>	Cadmium or chrome yellow, Venetian or Indian red, rose madder and much white.

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<i>Aquamarine:</i>	Cobalt blue, yellow ochre and white.
<i>Azure blue:</i>	Ultramarine blue, viridian green and a great amount of white.
<i>Beige:</i>	Raw sienna and very much white.
<i>Black:</i>	Any two complementary colors or three pigment primaries.
<i>Brown:</i>	Red and green (much more of the red than the green) or red and black (just a touch of the black).
<i>Buff:</i>	Yellow ochre, Venetian or Indian red and much white.
<i>Carnation:</i>	Vermilion, rose madder and white, or cadmium red (medium) and white.
<i>Chocolate:</i>	Burnt umber with a little white or vermilion with black.
<i>Cream:</i>	A little cadmium yellow with much white.
<i>Green:</i>	Cyanine or cerulean blue and cadmium or chrome yellow.
<i>Olive:</i>	Cadmium yellow and black or cadmium yellow and ultramarine blue or terra verte and white.
<i>Orange:</i>	Cadmium red and cadmium yellow.
<i>Peach:</i>	Vermilion or cadmium red (light) and much white.
<i>Peacock blue:</i>	Ultramarine blue, viridian or emerald and much white.
<i>Pink:</i>	Cadmium red (medium) and much white.
<i>Purple:</i>	Ultramarine blue and rose madder or black and rose madder.



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<i>Rose:</i>	Rose madder or madder lake or alizarin crimson with much white.
<i>Salmon:</i>	Burnt sienna, yellow ochre, a bit of vermilion or cadmium red and much white.
<i>Sapphire blue:</i>	Ultramarine blue and white.
<i>Seal brown:</i>	Burnt umber, yellow ochre and white.
<i>Shell pink:</i>	Cadmium red (light) or vermilion, burnt sienna and much white.
<i>Sky blue:</i>	Cerulean or cyanine blue with much white.
<i>Straw:</i>	Cadmium or chrome yellow with much white.
<i>Tan:</i>	Burnt umber, burnt sienna and much white.
<i>Terra cotta:</i>	Venetian red and yellow ochre.
<i>Violet:</i>	Ultramarine blue and rose madder.

There are very many more other colors that you can mix. But you should always remember, when mixing colors, that combining two primary or analogous hues results in another hue, whereas mixing complementary hues results in a neutral color or black, depending on the amount of each hue. For example, mixing cadmium yellow and cadmium red will give you orange. Mixing cobalt blue with viridian green will give you a blue-green. However, mixing a light cadmium red with cobalt or cerulean blue will produce black or a very deep shade of blue or brown, depending on the amount of each color.

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Mixing yellow with ultramarine blue will do the same.

Also keep in mind that you neutralize or gray a color by adding merely a touch of the complementary color. You add a touch of green to neutralize red and a touch of red to neutralize green. The color charts show which of the colors are complementaries.

By keeping the above in mind and with a little practice, you can learn to mix the colors you want.



## *Appendix*



## *Appendix*

### *A NOTATION ON COLOR ORGANIZATION*

Munsell and Ostwald have systematized colors, and in that respect they have put color usage on the same level with music. Each has made a most important contribution. However, both systems incorporate some negative elements. They are rigid, regimented and academic. They are not tuned to specific purposes and are too complicated for the average color user.

The color charts in this book incorporate principles from both the Munsell and Ostwald systems. They are basic and simple so that everyone can use them. They permit much subjective choice of color combinations, and at the same time they guide the user of color in following physical, physiological and psychological principles.

Note that there are separate charts for primary hues with tints and shades and for primary hues with light and deep tones. For most purposes—for most printing—it is advisable to use tints and shades. For other purposes—as for many interiors and for textiles—tones are more appropriate.

Every artist or art student is familiar with color circles or color wheels. The color circle is an exten-

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sion in circular form of the spectral band of hues. Some circles consist of the six spectrum hues only; some extend the hues to twelve, and others to twenty-four and even more hues. The additional hues are created by mixing hues with each other.

Complementary hues are always opposite each other on the color circle, and if the three primary colors (triad) in the circle (for additive or subtractive mixture) are connected by lines, a triangle is formed.

The color circle of only pure hues is easy to comprehend, but a circle with bands of tints, tones and shades is confusing and bewildering to most people. On a chart it is much easier to grasp the relationship between pure hues and color values.

Some students of color are concerned about the absence of purple in the visible spectrum. This, however, is a purely subjective feeling of omission. The universe makes no mistakes; man does.

There is no more reason for purple in the visible spectrum than there is for orange-yellow, yellow-orange, and the numerous blues, greens and reds. Mix the violet-blue (at one end of the visible spectrum) and the magenta red (at the other end), and you have purple.

We should always keep in mind that the name "purple" has subjective significance. What one person calls purple another names indigo or violet. Some physicists call magenta red purple.

Also, purple can be a shade instead of a pure hue.

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A shade of magenta red is a rich, deep purple. In other words, you can get a purple by adding black to magenta red. The chart facing page 92 shows a purple shade.

Art students are familiar with split complement color harmonies. Splitting a color means substituting two colors that are at equal distance on both sides of the color in the color circle. Split color harmonies have for years been advocated by many artists, designers and authors. They are not recommended here because they are psychologically unsound.

Since we respond optically and psychologically to pairs of hues, a third hue is superfluous. Combinations of more than two hues are gaudy and taxing to the emotions. It should be remembered that even in using two hue combinations, one of the hues should predominate; the second one should primarily serve as an accent.

Also, it should be kept in mind that limiting color combinations to two hues does not mean a limitation in the number of colors. Many values of each of the two hues produce harmonious effects. For example, you can have a combination of as many as four or five values of magenta red with an equal or lesser number of greens. Numerous color combinations are possible by using various values of complementary hues. And white or gray in small areas can always be part of a color plan.



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### *A NOTE ON THE COLOR OF HEAT*

Some physicists, who have no knowledge of psychological factors, do not recognize that blue produces sensations of coolness, that red produces sensations of warmth, and that orange is the warmest of all colors. One physicist justified his attitude by the fact that in raising the temperature of an object from invisible heat to visible heat or light, blue heat is much hotter than red.

You can easily raise the temperature of an object through various color (wave length) changes to the point where it radiates visible white light. If you place a poker in a fire, the molecules of the poker gain kinetic energy, and their motion produces heat radiation. As the temperature is raised, the wave length gets shorter (and the frequency higher).

When the poker reaches a temperature of about 500 degrees it becomes "red hot." As the temperature is raised, the colors produced (because of the change of wave lengths), after red, are orange, then yellow, then green, followed by blue and violet. Finally the colors (wave lengths) merge and the poker gets "white hot."

Thermometer readings do not produce aesthetic sensations, and a "red hot" poker will burn you just as will a "blue hot" poker. But as long as you are not in direct contact with the hot poker, the colors of the heated iron produce visual sensations.

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Visually, red produces a feeling of nearness and warmth and blue of distance and coolness.

All phenomena take place within the laws of universal nature. Everything in the world is based on cosmic orderliness. But we should also be aware that we are organic beings who receive sensations through senses which do not function in the same way. Our senses of seeing, hearing, taste, touch and smell have distinct characteristics and receive different sensations. A radiator that looks cold may feel very hot to the sense of touch. A color that the thermometer may show to be very hot can be very cold to the sense of sight.

### *A MESSAGE TO SHOPKEEPERS*

The chapter on "Color In Merchandising" treats the various factors in displaying merchandise; however, a special message to shopkeepers should be of benefit.

A number of store operators have learned that color is a profitable sales medium. However, at present few realize that scientifically applied color can improve service and increase sales considerably.

The dark interiors of the present-day average store interfere with efficient service and are responsible for loss of numerous sales. The near-black mahogany woodwork, dark floors and drab walls create an unfavorable psychological effect and, in

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addition, are the greatest causes of excessive electricity bills.

Colors now commonly found in stores reflect less than five per cent of the light, whereas appropriate color values reflect nearly 50 per cent of the light and at the same time are pleasing and inspiring.

It has already been demonstrated that a color-tuned store boosts the morale of the clerks and attracts customers. It should be kept in mind, however, that color-tuning a store does not mean merely decorating it, but using colors for specific functional purposes.

The right color on the walls makes the store interior more pleasant. It gives the merchandise greater visibility and makes it appear more attractive. Of course, mere change of color does not accomplish this. Rather, it is the application of the appropriate hue of the right value. Proper contrast in value as well as appropriate hue is of utmost importance in drawing attention to merchandise and in creating a favorable impression.

In a color-tuned store, the floor, ceiling, walls, shelves and counters present a harmonious and unified effect of complementary tones. Each tone is specifically planned to provide favorable psychological effect, desirable light reflection and a proper contrasting background for the merchandise.

If necessary, even the physical characteristics of the store can be modified with color. Light, cool tones will give the appearance of additional spacious-

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ness to a small store. A long narrow store can be made to appear shorter and wider by the use of a deep warm tone on the narrow distant walls and a light cool tone on the long side walls. If you know that cool and light colors produce a sensation of distance and that warm and deep colors seem to come forward, you can create numerous optical effects.

In the store, as in the industrial plant, colors should also be used as a safety device. To increase their visibility, columns and doors should be complementary to the walls. Steps should be given a color of strong visibility. At the same time the visibility color must be in harmony with the other colors in the interior. If the doors are peach (a greatly diluted orange-red), the staircase can be a neutralized orange-red. (Pure orange-red would be too vibrant and distracting in a store.) Since the columns, doors and stairs should be complementary to the walls, the walls of course would be a tone of green-blue.

All human beings are consciously or unconsciously influenced by pleasant surroundings. In a pleasant store environment it is natural for the clerks to be in high spirits and to have a friendly attitude toward customers and fellow employees. Customers like to patronize stores that have friendly clerks and pleasing, harmonious interiors, although they are generally not aware that colors are mainly responsible for their desire to patronize such stores.

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In summary, color-tuning a store is profitable because colors that are scientifically planned (1) reflect a considerable amount of light, (2) prevent accidents, (3) give the merchandise greater visibility, (4) make the merchandise appear more attractive, (5) raise the morale of the employees, and (6) attract and draw customers.

Often the saving in the electricity bill because of the proper color reflecting about 40 per cent more light will pay for color-tuning the entire store. The other five elements merely mean so much additional business with no added expense.

### DEFINITIONS OF TERMS

*Additive Color Mixing*—Primary color lights are combined additively to make secondary colors (primaries in pigment) and white light as is shown in the illustration facing title page. Three rays of light are directed at a screen through filters of primary colors. Thus the rays that strike the screen are orange-red, green and violet-blue. Where the orange-red and green merge, we see yellow. Where the green and violet-blue merge, we see green-blue. Where the violet-blue and orange-red merge, we see magenta red. Where all three colors merge, we see white light.

*Afterimage*—The color that appears after the eye has been stimulated by another color. Looking at a color for about 30 seconds before turning the gaze to a white or neutral surface brings forth an afterimage of the complementary color. This phenomenon is due to the

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fact that complementary colors are seen by one optic nerve. The eye has an optic nerve for red and green, another nerve for blue and yellow. Mixed colors are seen by co-ordination of the two nerves. The illustration facing page 85 enables you to experience an after-image.

*Chroma*—Means the same as tone. It is used by Munsell to describe the degree of purity or amount of gray content in a color.

*Color*—A general term that includes hues, shades, tints and tones.

*Color Chart*—A color chart of six hues of the spectrum, with one tint and one shade of each hue, is shown opposite page 92.

Other shades are created by increasing or decreasing the amount of black.

Other tints are created by increasing or decreasing the amount of white.

Tones can be created by mixing complementary tints or by mixing tints with shades or by adding black and white (gray) to the hue.

The numbers from 1 to 6 identify the hues; *b* means black added, and *w* means white added.

More hues can be created by mixing one hue with another.

*Color System*—An organized plan of color combinations based on physical, optical and psychological principles.

*Complementary Colors*—Colors that are physically, physiologically and psychologically related. Of the complementary colors, one is always a primary color and the other a secondary or a mixture of the two other primaries.

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*Contrast Factor*—Degree of contrast between colors. A deep shade and a delicate tint have maximum contrast. Complementary hues are also contrasting.

*Cool Colors*—Blue and colors in which blue is dominant.

*Hue*—A pure spectrum color without black or white.

*Juxtaposition*—Placing colors side by side.

*Primary Colors*—Basic hues that cannot be broken down into component parts. In pigment, the primary hues are green-blue, yellow, and magenta red. In light, the primary hues are violet-blue, green, and orange-red.

*Reflection Factor*—The degree of white light that a color reflects.

*Secondary Colors*—Colors consisting of two primary hues. The primary colors in pigment are the secondary colors in light. The primary colors in light are the secondary colors in pigment.

*Shade*—A hue with black added. The chart facing page 92 shows a shade of each of the six hues.

*Specific Identity*—A color in which the hue can be recognized instantly is said to have "specific identity." A color with much gray content (a tone) does not have specific identity, although it does produce a characteristic psychological effect.

*Spectrum*—The band of colors seen when a ray of light is broken up by a prism (or by raindrops as in the rainbow). See illustration facing page 32.

The hues of the spectrum are popularly called red, orange, yellow, green, blue, violet. More correctly, the colors should be called magenta red, orange-red, yellow, green, green-blue, violet-blue.

Orange-red, green and violet-blue are the primary colors. The other hues result from merging of the primaries.

## APPENDIX

**Subtractive Color Mixing**—Primary color pigments are combined subtractively to make secondary colors (primaries in light) and black, as shown in the illustration opposite page 49. The procedure is called subtractive because when a color is added to another color, part or all of the light is subtracted.

The three rectangles are the three primary colors of pigment. Where the green-blue and yellow overlap, green is the result. Where the green-blue and magenta red merge, violet-blue is seen. Where the magenta red and yellow mix, orange-red appears. Where all the three primaries of pigment merge, black is the result.

**Tint**—A hue with white added. Pages 101 and 108 illustrate complementary hues diluted to tints of four values.

**Tone**—A hue with white and black (gray) added. Pages 241 and 256 illustrate complementary hues neutralized into two tones, one light and one deep. The capital letter *B* and small letter *w* over the color circle mean that black is the major element in the color and white is the minor. The capital letter *W* and small letter *b* over the color circle mean that white is the major element in the color and black is the minor.

**Value**—The intensity, lightness or darkness of a shade, tint, or tone.

**Vibrant Colors**—Pure warm hues and pairs of pure complementaries.

**Warm Colors**—Red and yellow and colors in which red and yellow hues are dominant.

**Wave Length**—Colors travel through space in waves of radiant energy. The wave length is the distance from crest to crest in the waves. Specific colors correspond to definite wave lengths of light. Mixtures of colors are mixtures of wave lengths.





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